INVESTMENT STRATEGIES OF SOCIAL FUNDS AND RISK CONTROL METHODOLOGIES

VOLUME ON 2017 RESEARCH

TOPIC 2.3.1

EU-CHINA
Social Protection Reform Project
中国-欧盟社会保障改革项目

Component 2

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VOLUME ON 2017 RESEARCH

TOPIC 2.3.1

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This publication has been produced by the EU-China Social Protection Reform Project, co-funded by the European Union and the Government of the People's Republic of China. The content is the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union or Ministry of Finance, P. R. China.

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Strategies, Risk Control and Investment Policy of Social Insurance Funds in China

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Abstract

Demographic dividend has been widely regarded as a critical contributor to China's rapid economic progress over the past decades. However, as a result of "one family one child" policy, population imbalance between young and old people is becoming increasingly noteworthy. China is currently suffering from severe aging issue and has the largest amount of elderly population in the world, which brings mammoth demographic pressure to the Chinese pension system. Chinese ongoing pension system reform is still working towards an effective and sustainable solution for pension deficits. The basic social insurance funds have begun to invest in capital market now; one of the most important tasks is how to learn from the experience of the National Social Security Fund (NSSF) and Enterprise Annuities that commenced to invest more than ten years ago. All kinds of Chinese pensions ought to enjoy lower management costs and gain better returns.

The Netherlands' quasi-mandatory occupational pension system, the UK's auto-enrollment reform and local government pension scheme, and the notional defined contribution in Sweden and Italy can offer China both experience and lessons on pension funds investment strategies and risk control. So the policy suggestion is that China could learn from the foreign experience to invest pension into capital markets, best strategy is invest in the composite index funds. To prevent the potential risk, pension investment could place an upper limit 40% of its assets, and invest overseas to eliminate "home bias", to reduce the risk of a single country investment.

Key Words: Pension System, Investment Strategies, Risk Control, Policy Suggestion

I. Introduction

China is still a relatively young nation, facing many challenges typically found in a young nation, e.g. from educating children and creating jobs for a growing workforce to building a modern economy. However it is about to undergo a stunning demographic transformation.The data from China's sixth census of 2010 shows that: China is the only country in the world where the elderly (aged 60 and over) population is more than 100 million, and that number is growing by 3.2% annually.[1]Based on the forecast of the United Nations, China's elderly will reach 438 million in 2050, at the same time children (aged 0-14) will be only 185 million.[2] According to the IMF, the working population as a proportion of the total population will peak in 2010 and fall steadily afterwards. The median age is forecasted to rise from 32.5 years in 2005 to 48 years in 2050. [3]Clearly, China's population is ageing quickly, which will have a strong impact within one generation. Ageing populations set to impact China drastically, while in comparison today's developed countries were all affluent societies with mature welfare states by the time they became aging societies.

Taking into account the globally unique "one family one child" policy[4], in the coming decades China will face increasing pressure from the pension system. The rapid aging of China's population could act as a multiplier on the social and economic stresses of rapid modernization. Despite China's lofty national savings rate, only a small number of employees are accumulating sufficient financial assets to support them in retirement. Based on the current fiscal regime, the public pension system will be incapable of supporting the fallout; the private pension fund system is not yet adequate to meet the crisis of future's payments. China should institute a major national strategy for its social security by developing private pensions, investing properly and developing a pension system incorporating enterprise annuity and occupational pensions.

As an emerging economy, China has not yet accumulated enough pension funds for the newly retired that worked during the planned economy period. Hence, local governments have to divert the funds of

[1]*Communiqué of the National B*ureau of Statistics of People's Republic of China on Major Figures of the 2010 Population Census (No. 1), National Bureau of Statistics of China, April 28, 2011.

[2]United Nations, World Population Prospects: The 2006 Revision, New York: UN Population Division, 2007.

[3]See: http://www.pensionfundsonline.co.uk/content/country-profiles/china/105

[4]Please note that on 1 January 2016 "one family two children" policy started to be implemented in China.

the current employees' personal accounts' savings to pay the retirees' pension. As a consequence, the current employees' personal accounts are de facto partly empty. [5]

Social insurance funds are the cornerstone of social security system, so proper management of the funds plays an important role in ensuring the adequacy of post-retirement benefits of the retirees. . The State Council issued the Basic Old-Age Insurance Fund Investment Management Approach (Guo Fa [2015] No.48) in August 2015. It is a regulation to define and oversee the investment management of Chinese Social Insurance Law's insurance funds. According to this regulation, the public pension fund could invest up to 30% of its net assets in the stock market. Additionally, it can invest up to 20% of its net assets in key state-owned or state-controlled enterprises, core competitiveness of local industry leaders, and provincial finance departments. Fiduciary, custody, and investment management agencies must establish a sound internal control system of investment management to safeguard pension funds.[6]

Consistent with the above regulation, and to define problems existing in the design and implementation of the current social insurance fund system, the present research shall focus on investment theory, international comparison, judgment of current situation, and discovery of future opportunity for getting common understanding of the situation.

The objective of the EU-China Program is to strengthen Chinese government's capacity of conducting reform on social insurance investment system, to perfect existing legal and regulation frameworks, to integrate Chinese authorities' capacity of managing social insurance funds, and to control the risk of social insurance funds' investment. According to the comments of MOF and MHRSS, this project will acquire experience and lessons of European countries like the Netherland, the UK, Italy, Sweden, etc., so as to make policy suggestions to make a contribution to fulfill the foregoing objects.

The second section of this report is a brief introduction of current Chinese pension system. The third section provides a quick overview of some foreign pension cases that could be learnt by China. The fourth section is a summary discussion about current and possible measures connected to investment

[5]Shouji Sun and Jiye Hu, "The impact of pension systems on financial development: An empirical study". Michael Faure and Niels Philipsen (ED), *The Role of Law and Regulation in Sustaining Financial Markets*, Routledge, Aug. 2014.

[6] Ministry of Human Resources and Social Security, Ministry of Finance, "Background of Investment Management Measures of Basic Old-Age Insurance Fund" (28 August 2015), See: http://www.china.com.cn/zhibo/zhuanti/ch-xinwen/2015-08/28/content_36441785.htm

strategies and risk control. The fifth section describes the prospect of Chinese pension system. The last one presents our research methodologies.

II. Current Chinese Pension System

Economic reforms in China that started in the late 1970s had a strong impact on the pension system that existed at the time, in which state-owned enterprises directly provided pensions to their employees, supported by fiscal subsidies. The pension system was part of the "iron rice bowl "phenomenon, an all-encompassing social security system for employees of state-owned enterprises.

Following pilot projects in Shanghai and Guangzhou, the urban pension system was officially launched in 1997 with the announcement of a revised pension policy. While pensions were provided by state-owned enterprises in the previous system, a basic social insurance system took over. The reform started at the provincial level with a view to expanding it to the national level.

The basic social insurance system consists of pillar 1A, a pay-as-you-go social pool, which is financed exclusively by employers' contributions 20% of wages; and pillar 1B, a funded portion consisting of individual accounts that was financed by employees' contributions of 8%. Before 2015, China's urban pension system is dual tracks: the public servants and public institutions' employees were not needed to contribute their salary, and their pension was paid by state; at the same time, all companies' employees, including state-owned enterprises, must contribute a certain proportion of their salary to the pool of the basic social insurance funds. Currently, all the newly joined 8 million public servants and 32 million public institutions' employees will also pay 8% of their salaries in funded individual accounts. Their employers will contribute another 20% in the social pool. The new contributions of public servants and public institutions' employees will help to curb the potential deficit.

Although it is fully funded in general, pillar 1B has suffered a lot because local governments took money from these accounts to cover pension deficits in the pay-as-you-go pillar 1A. This led to the problem of "empty accounts". To remedy the situation, the Chinese authorities have taken steps to "refill" pillar 1B through fiscal transfers from the local and central governments. This measure is part of a pilot pension reform project in the Liaoning province that started in 2001. The project aims to fulfill empty accounts with funds equivalent to 5% of salaries. 3.75% is financed by the central government, and the local government finances the remaining 1.25%. Once the accounts have been filled, the balance increases by 1% of salaries each year until 8% is reached.

Given the Liaoning pilot reform led to some positive results, the initiative was extended to the provinces of Heilongjiang and Jilin in 2004 and further to another eight provinces in 2006. But so far the reform of refilling the empty accounts is far away to success. So the reform of the first pillar will likely focuses on establishing the pension system on a national level by which to enlarge the social pooling of whole country. Today, pension pooling operates at the provincial, municipal or county level. Administration is decentralized, meaning that local discretion is considerable.

In April 2017, The Ministry of Human Resources and Social Security and the Ministry of Finance issued a document (Renshebu Fa [2017] No.31) that all the urban workers (company employees and public sector employees) must bill a unity and standardized individual account rate. The billing rates should be adjusted regularly so as to consider the growth rate of wages, fund balance situation, and other reasonable factors. [7]This rate is a nominal rate, not a real return of pension funds. In the announcement of the official website of Ministry of Human Resources and Social Security on 27 June 2017, in 2016 for all the individual accounts of urban workers, including all companies 'employees, public servants and public institutions 'employees, the billing rate will be as high as 8.31%. That billing rate in 2014 and 2015 was only 5%.

In the section 14 of China's Social Insurance Law, the individual account-billing rate must be higher than one year's deposit rate, now only 2.75%. The annualized return of seven days in Alipay virtual account is only 4.15% in June 2017. So 8.31% is higher than almost all the current wealth management products, even higher than the weighted average earning rate of enterprise annuity, 7.57%; only lower than the investment-earning rate of National Social Security Fund, 8.57%.

The higher rate is good news for all the 370 million urban workers; but what is more important concerns the pension's sustainability. As no real money is paid to the pension funds of individual accounts, by promising higher rate, the government would have to incur heavier obligation in the future.

Besides the basic social insurance fund acting as the first pillar, the enterprise annuity system was created as the second pillar in 2004.The enterprise annuity is a voluntary occupational pension system. The reform of public servants and public institutions' employees in 2015 also created a newly occupational annuity, but it is a mandatory one: the employers must contribute 8% and employees pay 4% of their salary in the occupational pension accounts. So the second pillar in China has also two tracks: voluntary for companies' employees and mandatory for public sector employees.

[7]See:http://www.mohrss.gov.cn/gkml/xxgk/201704/t20170424_269935.html

The third pillar pension in China is still in the immature stage, e.g. some enterprises buy group life insurance for their employees as a kind of benefits. The Ministry of Finance, the General Bureau of National Taxation and China Insurance Regulatory Commission jointly issued the notice (Caishui [2017] No.39), stipulating that all personal purchase of commercial health insurance products could be deducted before tax, and the limits RMB2, 400 per year, or RMB200 per month. [8] Given the regulatory support, it is believed that the third pillar pension in China will develop faster in the future.

2.1 The rural pension system

The public pension system in China comprises an urban and a rural system. The latter was specifically designed for rural areas and differs considerably from the system in place in urban areas. Pension participation is voluntary and operational matters are left to local governments. Benefits are far less generous compared with the urban pension system, and participation in the rural system is very limited. According to 2003 estimates, 54 million people participated, which accounted for 9% of the total rural population. In 2006, a pilot project was launched in rural Beijing to include more people. It aims to include more rural population of almost all the three million people in the formal pension system.[9] By the end of 2016, the number of basic pension insurance for urban and rural residents was 508.47 million, an increase of 3.75 million at the end of the year. 152.7 million of them were actually paid. [10]

2.2 The urban pension system

Rural migrant workers in urban areas, of which there are approximately 150 million, are not generally covered by the urban pension system. Participation is allowed, but not compulsory. Both employers and rural migrant workers, however, are reluctant to join, because participation entails higher labour costs for employers, whilst migrant workers are more interested in immediate wages than in pensions. What's more, their high mobility across regions impedes participation. In order to encourage employers and employees to participate, local governments have started experimenting various pilot schemes. For example, in some cities like Shenzhen the contribution rate to pillars 1A has been

[8] See: http://www.chinatax.gov.cn//n810219/n810744/n2672992/n2672997/c2644800/content.html

[9] See：http://www.gov.cn/ztzl/fwzk8/content_135238.htm

[10]参见：http://www.mohrss.gov.cn/SYrlzyhshbzb/zwgk/szrs/tjgb/201705/W020170531358206938948.pdf

reduced from 20% to 14%, with sole contribution from employers. [11]In some other cities, the contribution rates are 8% for employers and 5% for migrant workers.

2.3 The National Social Security Fund

On 1 August 2000, the Central Committee of CPC and the State Council decided to establish National Social Security Fund (NSSF), and set up the National Council for Social Security Fund (SSF) for managing and operating the NSSF's assets. NSSF aims to be a solution to the problem of ageing and serves as a strategic reserve fund accumulated by the central government to support future social security expenditures and other social security needs.[12]

Strictly speaking, the NSSF is not part of any pillar of pension system. NSSF serves as the national social security reserve fund to supplement and adjust the social security spending such as social insurance during the peak time period of the aging of population. The funding sources of NSSF include fiscal allocation from the central government, the transfer of state-owned capital and the fund investment proceeds and capital rose by other methods approved by the State Council. The total assets of NSSF reached RMB 2,042.33 billion at the end of 2016; the average annual return is as high as 8.37% since 2000, with total RMB 822.73billion investment profit.[13] The long term high earning rate makes the NSSF as the model agency among all the other pension management institutions. The NSSF could do better in the future as the State Council promulgated new Decree of "The National Social Security Funds Regulation" (The State Council Decree No.667) in March 2016, which by constituting as the legal foundation for the national social security funds to further develop and expand, the NSSF would be entrusted by provincial social insurance fund in the future

Under relevant provisions of the Interim Management Measures on the Investments of the National Social Security Fund, the Interim Management Measures on the Overseas Investments of the National Social Security Fund, the NSSF are permitted to invest in the following products:

[11] The section 11 of Shenzhen social ageing insurance regulation, See: http://www.szsi.gov.cn/sbjxxgk/zcfggfxwj/ylbx/201212/t20121226_2094910.htm

[12] Lang, Gunnar and Yu, Shen and Xu, Xian, Chinese Pension Fund Investment Efficiency - Evidence from CNCSSF Stock Holdings (January 27, 2014). ZEW - Centre for European Economic Research Discussion Paper No. 14-007.

[13] The 2016 Annual report of the National Council for Social Security Fund, see:http://www.ssf.gov.cn/cwsj/ndbg/201706/t20170612_7277.html

1) Domestic investments: bank deposits, treasury bonds, financial bonds, corporate bonds, securitized products, securities investment funds, stocks, industrial investments, industrial investment funds and trust investments.

2) Overseas investments: bank deposits, foreign treasury bonds, bonds of international financial organizations, bonds of foreign entities, foreign corporate bonds, overseas bonds issued by the Chinese government or Chinese enterprises, money market products such as banking drafts and large CDs, stocks, funds, derivative instruments such as swaps and futures, and such other investment products or instruments jointly approved by the Ministry of Finance and the Ministry of Human Resources and Social Security.

2.4 Occupational Pensions: Enterprise Annuities

Enterprise Annuities were established in 2004. Besides the newly established Enterprise Annuity funds, there are also legacy funds, namely company funds that were established before the Enterprise Annuity legislation was introduced. They are currently managed by local social security agencies, but the government intends to hand the management over to private companies. To make this process easier, the then Ministry of Labour and Social Security introduced a temporary guideline in April 2007 on how legacy funds can be transferred to the private sector. Two of the largest local administration centers were reformed; one was turned into an independent insurance company, while the occupational pension business of the second centre was handed over to two Chinese financial institutions. [14]Group pension insurance contracts are another means with which employers can provide their employees with old-age pension funds.

Enterprise Annuities are voluntary occupational plans that are fully-funded defined contribution accounts. They are established as a trust that can take the form of either an internal or external trustee model. The internal trustee, who is known as the pension council, is similar to the trust system in the UK. Financial institutions serve as external trustee, which is referred to as the professional trustee in China. In the case of the pension council model, by regulation at least one-third of trustee members should be employee representatives. By comparison there is no such requirement for the professional trustee model.

Employer contributions are limited to a twelfth of employee salaries, and the combined employer/employee contribution should not exceed a sixth of total wages. To provide Enterprise

[14]See: http://www.pensionfundsonline.co.uk/content/country-profiles/china/105

Annuities to their employees, enterprises must have participated in the basic urban pension system, be financially sound and have collective bargaining mechanisms in place.

Only licensed financial institutions are allowed to manage and administer EA assets. Regulations stipulate that custodians must be independent from other service providers. In the internal trustee model, the trustee should outsource administration, asset management and custody services to other institutions that are licensed to operate these businesses. In the external trustee model, the trustee can also provide administrative and asset management services, but not custody service. In some provinces, local governments have put regulations in place that require assets managers to provide a certain level of returns.

2.5 Investment regulations

According to the "enterprise annuity funds management measure" which was amended by the Ministry of human resources and social security, the China banking regulatory commission, the China securities regulatory commission, and the China insurance regulatory commission, as well as implemented since 1 May 2011, Enterprise Annuity regulations feature quantitative restrictions on investment policy. The most important regulations currently in place stipulate the following:

1) At least 20% of assets must be invested in high liquidity money market instruments such as deposits, central bank notes and short-term bond repos;

2) A maximum of 50% of assets can be invested in term deposits, contractual deposits, government bonds, corporate bonds, convertible bonds and securities. At least 20% should be invested in government bonds;

3) A maximum of 30% of assets can be invested in stocks, investment-linked insurance products and equity funds. Investment in equities should not exceed 20%.

With financial market development and more regulatory experience, investment restrictions are likely to be eased in the future. Other regulations affect pension service providers' fees. Fees are capped and differ according to the type of service:

1) Trustees: Up to 0.2% of the net value of the pension fund;

2) Administrator: Up to RMB 5 per month, to be paid by the plan sponsor;

3) Custodian: Up to 0.2% of the net value of the pension fund;

4) Investment manager: Up to 1.2% of the invested net value of the pension fund.

2.6 Pension benefits and taxation

If enterprises provide enterprise annuity plans, according to the "Enterprise Annuity Measure" which has been implemented since 1 February 2018, the contribution of enterprises is not exceeded 8% of the total wages each year. The total contribution of employer and employees does not exceed 12% of the total wages in the enterprise. However, tax benefits differ in practice from province to province. For example, in mid-2006, it was 5% in Anhui and 12.5% in Hubei. More tax relief will likely be granted to both employers and employees in the future, and a harmonized tax system is expected to be implemented. Investment income and pension contributions are taxed according to standard tax rates, so Enterprise Annuities are subject to an ETT system.

III. Foreign Experience and Chinese Path

As an emerging and developing country, China's social security system has a shorter history than most of developed countries. So learning from the experience of foreign countries could make the path of China more smooth and successful.

3.1 The Netherlands

The second pillar's assets of the Netherlands were as large as 178% of its GDP in 2015, which ranked the first in the world. China can learn from its quasi-mandatory occupational pension system experience, so as to make China's private pension system more sustainable in the long run.

As in many other European countries, the Dutch pension system consists of three pillars: the state pension (AOW), the supplementary collective pensions, and the private individual pension products that each person can arrange for him-/herself. The first pillar's pension rights are accrued during working life, which is a pay-as-you-go system. Risk sharing, efficiency and collective schemes are key characteristics of the 2nd pillar system. New accounting rules and new technical provisions in order to keep a proper solvency margin of the schemes as well as an ageing society and increasing costs of pension systems may result in the reduction of pension benefits.

In the Netherlands there is no legal obligation to become a member of a pension fund. But if the social partners decide to provide a pension scheme for their employees, the government can make a pension

scheme mandatory for an entire sector or profession. Thus, more than 90% of employees have a pension scheme with their employer.[15]The quasi-mandatory second pillar pension system ensures industry-wide pension funds with sufficient economies of scale, enabling cost efficient management of the schemes. Furthermore, the mandatory nature means that all employees are members of a good pension scheme. The government wants to create solidarity through compulsory participation. In addition, it means that employees can change jobs more easily within the sector without worrying about a negative impact on their pensions. Companies that do not fall under such a mandatory scheme can opt either for a corporate pension fund or for an insurance company to manage their pension scheme. So the net pension replacement rate by earnings in the Netherlands is as high as 95.7%comparing with the OECD 34 countries' average of 63%.[16]

3.2 The United Kingdom

The United Kingdom is one of the few European countries that had not suffered serious pension crisis. The reasons are straightforward: state pensions (both in terms of the replacement ratio and as a proportion of average earnings) are one of the lowest in Europe. The UK has a long-standing funded private pension sector, its population is ageing less rapidly than elsewhere in Europe and its government has, since the beginning of the 1980s, taken measures to prevent pension crisis incurring.[17]These measures have involved making systematic cuts in unfunded state pension provision and increasingly transferring the burden of providing pensions to the funded private sector, principally on a defined contribution basis.

In 2012, a trust-based workplace pension scheme, established by the UK legislation body to support automatic enrolment and ensure that all employers have access to a quality, low-cost pension scheme with which to meet the employer duties. A worker who is not eligible for automatic enrolment can choose to "opt in" to an automatic enrolment scheme. If they do opt in, their employer must still make a contribution. Non-eligible jobholders are in either of the following two categories: a worker who is aged at least 16 and under 75 and earns above the lower earnings level of qualifying earnings but below the earnings trigger for automatic enrolment; or is aged at least 16 but under 22, or between State Pension age and under 75; and earns above the earnings trigger for automatic enrolment.

[15]Sibylle J.M. Reichert, The Dutch Pension System: an overview of the key aspects, Dutch Association of Industry-wide Pension Funds (VB), 2014.

[16]OECD (2015), *Pensions at a Glance 2015: OECD and G20 indicators*, OECD Publishing, Paris. pp.145.

[17]David Blake, *Two decades of pension reform in the UK： What are the implications for occupational pension schemes?*, Employee Relations, Vol. 22 No. 3, 2000, pp. 223-245.

A type of workplace pension organized by an employer (or on behalf of a group of employers) to provide benefits for employees on their retirement and for their dependents on their private sector, occupational schemes are trust-based. Types of occupational scheme include DB, DC and hybrid schemes.

In addition, British pension fund pooling construction may also give China some inspiration. UK's social security funds and occupational pension schemes for public institution employees feature a pays-as-you-go scheme. As an exception, the Local Government Pension Scheme (LGPS) covering local government workers and consisting of 98 separate funds all over the UK is a defined benefit scheme (DB) which has the general objective of being funded at 100% of past and future service liabilities evaluated in triennial actuarial valuations. However, the traditional investment revenue such as deposit interest and equity dividends cannot satisfy LGPS's deficit, which has made LGPS consider alternative investments such as in private equity, hedge funds and infrastructure to achieve higher net returns. To cut costs in these investment categories, British government is establishing a larger pool of LGPS to reduce fund management and transaction costs, in order to get more net returns as a result of the economies of scale benefit.[18] It is noticeable that each separate fund's autonomy in its investment strategy is retained, breaking through current interests layout is the largest obstruct during every reformation, reserving each fund's discretion in investment and the expected greater income would smooth the reform effectively.

Learning from the UK's 2008 pension act, reform of China's second pillar could draw lessons from British auto-enrollment reform, as well as its occupational pension regulation system. The Pension Regulator (TPR) of the UK is a good model for China. Each provincial government holds Chinese pension system for enterprise employees, which is similar to the UK's 98 separate local government pension funds. A large pension fund pool for provincial enterprise pension funds, keeping the original provincial strategy autonomy to the same extent as the LGPS pool, may reduce some running cost so as to gain more investment return.

3.3 Sweden and Italy

If China reforms its first pillar public pension, the "empty accounts" maybe reformed to notional accounts, by which the experiences from Italy and Sweden would be very useful.

[18]Grayson Clarke, *Investment Strategies for LGPS Funds in the UK*, forthcoming.

The first non-financial (notional) defined contribution (NDC) pension system was established in Sweden in 1994, and Italy adopted NDC in 1995. NDC is a combination of pay-as-you-go financing and an individual lifetime account. Pensions are granted as life annuities, based on the individual's account balance and his or her birth cohort's life expectancy at retirement. An internal rate of return, based on the economic fundamentals of the system, steers the system towards long-term financial balance and assures maintenance of a fixed contribution rate, in principle, forever. Detailed NDC rules are different among countries. For instance, in general, NDC benefits are totally contribution-based, namely, the more money you contributed to the system, the more benefit you would enjoy. However, Sweden transferred general tax revenues on a yearly basis to the NDC reserve fund, which created a non-contributory right in the scheme. NDC acted as an alternative to help adopted countries to get rid of future pension system cost, which clearly will not be covered under pre-NDC solutions.[19]

As to risk control, because NDC cannot make an exception from being influenced by demographic and economic factors, financial problems still exist. When the pension system is threatened by large and long-term financial imbalances, both built-in and ad-hoc measures can be used to respond. However, it is noticeable that the public will be hard to convince when unexpected unfavorable macroeconomic or demographic scenario occur, which will definitely result in negative misperception related to personal benefits. Therefore, it is necessary to stipulate a built-in financial problem solution during the construction of NDC.

3.4 How China can learn

Based on the experience and lessons of above European countries, China's pension system must reform as soon as possible so as to ensure equality and sustainability, which is also the general target of social security reform set by the 3rd Plenary Session of the 18th CPC Central Committee in 2013.

In State Council's Decision on the Reform of the Old-age Insurance System for Government Bodies and Public Institutions (Guo Fa [2015] No.2), civil servant and public service unit will join the existing basic urban pension system, which will make all sector employees in China more equal.

[19] AgnieszkaChłoń-Domińczak, Daniele Franco and Edward Palmer, The First Wave of NDC – Taking Stock Ten Years Plus Down the Road.Nonfinancial Defined Contribution Pension Schemes in a Changing Pension World **Published:** June 2012 **Pages:** 31 - 84.

As to the sustainability of pension, China still has a long way to go. Allianz published reports of the Pension Sustainability Index (PSI) in 2014 and 2016, which combines various characteristics of pension systems with the factors that influence them to help track and evaluate policy changes made in different countries around the world. In addressing the sustainability of a country's public pension system, the PSI can give an indication of a country's need for reforms to maintain long-term financial sustainability. PSI of China was ranked 45th in all 50 countries in 2014. Two years letter, the situation of China's PSI became even worse. China was ranked 53th in all 54 countries in 2016, the last one is Thailand.

Emerging Chinese markets in particular are undergoing major structural changes. Strong economic growth has led to a prosperous middle class throughout the region. Increased urbanization and breakdown in traditional family structures, however, have caused extreme socio-economic changes, which are altering the entire retirement landscape. Even though China have had introduced pension reforms, there is still much work to be done. By 2050, it is expected to increase to an unsustainable level of almost 72%, compared to 39% in 2014.[20]In current study, the pension systems of China and Thailand are found to be the least sustainable in long-term. Both countries' population is expected to age quickly in the coming decades, which is expected to weigh on public finances, especially as the retirement age (both legal and effective) is low. Lacking of a comprehensive pension system and only a small share of the population is enrolled in pension plan; China must realize the importance of the um-sustainability of its pension system, and take concrete measures to avoid the potential pension crisis in the future.

IV. Risk Prevention of Pension Fund Investment

For the purpose to prevent the risk of pension fund investment, there are three kinds of regulations on the investment agents of pension fund beneficiaries among different countries: the statutory investment list, the investment quantitative limit, and the diversified investment requirements.[21] The pension fund investment proportion limit or the investment quantitative limit is regarded as the updated version of the statutory investment list, which means that the legislation only includes a broad scope of investments and an upper investment limit of specific object under this scope, instead of regulating the object and proportion of each kind of investment.

[20]Allianz. 2014. Pension Sustainability Index. Allianz International Pension Papers 1/2014.

[21]Jiye Hu, *In re pension supervision legislation*, China University of Political Science and Law Publishing House, 2013, P12.

4.1 A Commentary on Current Pension Fund Investment Rules and Regulations

The Measures for the Administration of Investment in Basic Pension Insurance Funds (2015) (Abbreviated as MAI in this chapter), stipulated the scope, the proportion, and the reserve fund of pension fund investment. In section 55: Trustees, custody institutions and investment management institutions that manage and operate pension fund assets, and other natural persons, legal persons or organizations that provide services for pension fund investment operation shall strictly observe the relevant occupational rules and industry rules, and perform their duty of good faith, prudence and diligence.

Provisions in MAI reveal that Chinese pension fund investment regulation is a combination of the abovementioned three kinds of pension risk-avoiding measures and the duty of good faith, prudence and diligence. Namely, it is an entity of quantitative and qualitative analysis.

Firstly, MAI only gives us a wide-ranging investment list, rather than detailed rules on specific security investment.

Secondly, MAI permits portfolio investment and stipulates maximum or minimum limits on pension fund investment proportion in different kinds of assets.

Thirdly, take a look on the proportion rules in MAI; although there is no provision on composition of investment within risky portfolio, it does stipulate a proportion relationship between risky portfolio and fixed income assets. In Article 37 (4), the aggregate proportion of investment in national key projects and equities of key enterprises shall not exceed 20% of net asset value of pension funds. It looks like this rule had interrupted the investment in risky portfolio, however, according to Risky Portfolio Theory, only when the investment proportion of single asset far below the whole investment scale, risk will be reduced effectively. Nevertheless, the 20% upper limit is too remote from the so-called “far below” standard, thus, Article 37 (4) is not a deviation of Risky Portfolio Theory.

Fourthly, MAI has provisions on reserve fund rate of investment management institutions and trustees. The reserve fund itself is a part of non-risk assets, not a risk management or hedge measure out of pension fund investment. Reserve fund barely takes effect on hedging risk; it strictly follows the Risky Portfolio Theory and is an element of portfolio. As a result, we should take reserve fund into consideration when talking about pension fund investment portfolio.

Fifth, most importantly, MAI is obligated and also able to stipulate the proportion relationship between the risky portfolio and the non-risk portfolio.

Lastly, section 55 requires trustees, custody institutions and investment management institutions that manage and operate pension fund assets shall strictly observe the relevant occupational rules and industry rules, and perform their duty of good faith, prudence and diligence. This rule is similar to the Prudent Person Standard in common law system.

It is widely accepted that Prudential Person Rule (PPR) originated from British trust law, which emphasizes the internal control on trustee, administrative structure, and information disclosure. Trustee must act under duty of care and duty of loyalty. The former duty requires a trustee to exercise the degree of care, skill, and prudence of a reasonable investor like investing in his own property. The later duty requests s a trustee to administer the trust solely in the interest of the beneficiaries and cannot engage in a transaction which is affected by a conflict between the trustee's fiduciary and personal interests. Court of Massachusetts ruled in the case of Harvard v. Amory (1830) , which was a milestone and of historic importance in PPR, that it was legal to invest in personal security if trustee acted under the duty of loyalty and honestly.[22] This rule abandoned the statutory investment list rule and formed the "Harvard Collage Rule". After World War II, "Harvard Collage Rule" enjoyed a more broadly and deeply influence. As a consequence of the wildly and fast spread of Harry M. Markowitz's Modern Portfolio Selection Theory, a new legal standard appeared for the Prudent Person Principle, in other words, trustee had obligation to diverse portfolio in order to reach maximum profit under the risk avoiding prerequisite.

Apparently, MAI's good faith, prudence and diligence obligation corresponds to Prudent Person Principle. However, they are not totally in match. Prudent Person Principle requires trustee to exercise the degree of care, skill, and prudence of a reasonable investor investing his own property, which is not mentioned in MAI.

4.2. The Ineffectiveness in Practicing Prudent Person Principle

The essence of Prudent Person Principle is "exercise like a reasonable investor investing his own property". This requirement looks reasonable; however, actually, it is not logical under Portfolio Theory.

According to the capital assets pricing model (CAPM) theory, although the risky assets market combination is certain, the proportion between the risky and non-risk assets is determined by investors themselves to satisfy their own risk preference. There is no CAPM theoretical limit on this proportion

[22]Harvard College v. Amory, 9 Pick. (26 Mass.) 446,461,1830.

distribution. However, pension creditors rather than pension fund investment managers determine pension fund's risk preference. The creditor in pension fund investment is the country, whose risk preference is different from investment managers. Firmness and stability are more attractive to country, while high profit is more preferred by investment managers. As a result, pension fund investment managers cannot act like a reasonable investor investing his own properties, and they must strictly follow pension fund creditors' risk preference.

Pension fund creditors should make their risk preference clear to investment managers. A same portfolio theory will make a huge difference between a RMB100, 000 investment and A RMB1 billion portfolio, since risk preferences cannot be the same.

Additionally, pension fund investment manager's portfolio is an incomplete integrity, and it must be supplemented by pension creditors' expense. This also contributes to the result that pension fund investment manager cannot act like investing his own property and must settle specific risk preference and assets risk structure together with pension creditors.

According to a report published by Morgan Stanley in 2016, the Japanese Government Pension fund investment Fund (GPIF), which is one of the largest pension funds among the world, had suffered an approximate $100 billion drop in securities market value. By the end of June 2016, Tokyo Stock Price Index (TOPIX) slid 19%. GPIF's purpose in holding the position was to invest 25% in Japanese stock and 35% in Japanese national debt. Due to the stock proportion's drop, purchasing more stock was the only choice for GPIF to satisfy its proportion object.[23]

After Japan's stock loss, the US cannot make an exception. The US largest public institution pension fund Calpers disclosed its rate of return during 2015-2016 financial years, which was the lowest since 2008 financial crises, mainly due tithe failure in stock investment. Calpers were the trustee of pension fund owned by 1.7 million retired public institutions employees in California, with the amount around $347.3 billion on 12 Feb.2018. The rate of return of 2015 financial year was merely 0.6%, compared to 2014's 2.4% and 2016's 6.1%, [24] which illustrated that other countries' pension fund risk management is imperfect.

Based on Prudent Person Principle, as long as pension fund investment manager acts as investing his own property and avoids interest conflict between creditor and himself, the manager would enjoy a

[23]Sohu Business, *The Hard Time of Low Interest Rate US and Japan lose money in pension stock investment*, http://business.sohu.com/20160720/n460090163.shtml

[24]See: https://www.calpers.ca.gov/

safe harbor from liability. This liability rule is likely to bring high risk to the whole pension fund cash flow.

Observing from the opposite angle, Chinese MAI has no requirement like Prudent Person Principle, but its principle of good faith, prudence and diligence could be more reasonable and sensible.

Furthermore, no matter PPR or MAI's requirement, it should be noticed that both of them need a practical and detailed regulatory standard in practice. The investment results matter, which means that there is huge vague and ambiguity when determining whether the trustee has fulfilled his prudent person or good faith and diligence obligation. This makes both prevention in advance and punishment afterward ineffective. However, under the direction of Portfolio Theory, MAI had specific quantity requirement for pension fund creditor and also has detailed pre and post investment regulation standard. Thus, we must balance the relationship between the qualitative analysis under good faith and diligence in MAI, and the abovementioned three kinds of risk prevention measures (the statutory investment list, the investment quantitative limit, and the diversified investment requirements), also cannot simply abolish one of them and take the other. Absolutely, the reasonableness of MAI's requirement to pension fund creditor is not an easy decision, and scientific discussion is essential, which is also a critical task of our project.

In conclusion, as to pension fund investment regulation, our projects will analysis the theory and historical data, so as to assess and improve the MAI's proportion requirement and explore how to reach better situation. Additionally, we will also research how to apply this rule to good faith, prudence and diligence principle effectively. Further, we will take effort to develop and design new financial product under the construct of MAI.

4.3 Compound Rate of Return in Stock Market Test of CAPM and Revision of Cash Flow

1） Compound rate of return in stock market test of CAPM

Now we move to the analysis of the nexus between risk and rate of return in Chinese financial market.

The following is the return-risk historical data of Shanghai Composite Index Fund (SCIF), 3-year national debt and 1-year bank deposit from 1991 to 2016.

Year	SCIF	3-year national debt	1-year bank deposit
1991	129.41%	10%	10.08%
1992	66.57%	9.5%	8.82%
1993	6.84%	13.96%	12.24%
1994	-22.3%	13.96%	12.24%
1995	-14.29%	14%	10.98%
1996	65.14%	13.06%	7.47%
1997	30.22%	9.18%	5.67%
1998	-3.97%	7.11%	3.78%
1999	19.18%	3.51%	2.25%
2000	51.73%	2.89%	2.25%
2001	-20.62%	2.89%	2.25%
2002	-17.52%	2.21%	1.98%
2003	10.27%	2.32%	1.98%
2004	-15.4%	2.74%	2.07%
2005	-8.33%	3.33%	2.25%
2006	130.43%	3.2%	2.52%
2007	96.66%	4.4%	4.14%
2008	-65.39%	5.61%	2.25%
2009	79.98%	3.17%	2.25%
2010	-14.31%	3.68%	2.75%
2011	-32.89%	3.87%	3.5%

The year of 1991 was still at the start period of stock market, stock price was highly underestimated, and thus there was a swift and dramatic increase of SCIF in 1991 and 1992, which were 129.41% and 66.57% respectively. We take them out of rate of return calculation as extreme outliers and only settle the statistic from 1993 to 2016.

Do the equal calculation, we can get the average rate of return of SCIF is R_1:

$$R_1 = \frac{6.84\% - 22.3\% + ... - 12.31\%}{24} = 13.41\% \quad (1)$$

The average rate of return of 3-year national debt is R_2:

$$R_2 = \frac{13.96\% + 13.96\% + ... + 4\%}{24} = 5.78\% \quad (2)$$

The average rate of return of 1-year bank deposit is R_3:

$$R_3 = \frac{12.24\% + 12.24\% + ... + 1.5\%}{24} = 4.07\% \quad (3)$$

From the simple equal calculation, we can know that the average rate of return of SCIF is far greater than the other two's. But it is noticeable that the rate of return is based on compound interest rather than simple interest, thus, we will use compound interest to do the calculation again.

Adjust 3-year national debt's simple interest to compound interest.

Year	SCIF	3-year national debt	1-year bank deposit
1991	129.41%	10%	10.08%
1992	66.57%	9.5%	8.82%
1993	6.84%	13.96%	12.24%
1994	-22.3%	13.96%	12.24%
1995	-14.29%	14%	10.98%

1996	65.14%	13.06%	7.47%
1997	30.22%	9.18%	5.67%
1998	-3.97%	7.11%	3.78%
1999	19.18%	3.51%	2.25%
2000	51.73%	2.89%	2.25%
2001	-20.62%	2.89%	2.25%
2002	-17.52%	2.21%	1.98%
2003	10.27%	2.32%	1.98%
2004	-15.4%	2.74%	2.07%
2005	-8.33%	3.33%	2.25%
2006	130.43%	3.2%	2.52%
2007	96.66%	4.4%	4.14%
2008	-65.39%	5.61%	2.25%
2009	79.98%	3.17%	2.25%
2010	-14.31%	3.68%	2.75%
2011	-32.89%	3.87%	3.5%
2012	3.17%	4.76%	3.5%
2013	-6.75%	5%	3.25%
2014	52.87%	5%	3%
2015	9.41%	4.92%	1.5%
2016	-12.31%	4%	1.5%

Assume SCIF's compound interest average rate of return is R_1:

$$(1+R_1)^{2016-1992} = (1+6.84\%)(1-22.3\%)...(1-12.31\%) \quad (4)$$

Then:

$$R_1 = 5.24\%$$

Assume 3-year national debt's compound interest average rate of return is R_2:

$$(1+R_2)^{2016-1992} = (1+12.37\%)(1+12.37\%)...(1+3.85\%) \quad (5)$$

Then:

$$R_2 = 5.32\%$$

Assume 1-year bank deposit's compound interest average rate of return is R_3:

$$(1+R_3)^{2016-1992} = (1+12.24\%)(1+12.24\%)...(1+1.5\%) \quad (6)$$

Then:

$$R_3 = 4.02\%$$

According to the calculation above, $R_2 > R_1$, and there is a huge fluctuation in SCIF's compound interest, obviously, which is a violation of CAPM.

As the average rate of return of SCIF is lower than national debts, and the high risk of SCIF, CAPM is not applicable to Chinese security market. Actually, no matter China and other country, an overestimate of average rate of return and an underestimate of risk is a common result of CAPM assessment of risky assets value. This is a due to unforeseeable crisis in financial market, for example, the 2008 global financial crisis. Because of the use of simple equal calculation rather than compound interest average, an overestimate of average rate of return appears. Especially when there is a huge fluctuation, the overestimate would be severer. Additionally, the CAPM model's inherent flaw of assumption always leads to the underestimate of risk.

Assume asset principal is A, Phase 1 asset yield is R+, Phase 2 asset yield is R, the arithmetic average is $\bar{R}_1$:

$$\bar{R}_1 = \frac{R+\varepsilon+R-\varepsilon}{2} = R \quad (7)$$

The compound interest average is $\bar{R}_2$:

$$\left(1+\bar{R}_2\right)^2 = \left(1+R+\varepsilon\right)\left(1+R-\varepsilon\right) \quad (8)$$

Then:

$$\bar{R}_2 = \sqrt{\left(1+R\right)^2-\varepsilon^2}-1 < R \quad (9)$$

From (9) equation, the bigger the fluctuation, the smaller $\bar{R}_2$. Thus, when the arithmetic average of rate of return is certain, the more fluctuated of actual rate of return, the smaller of compound interest rate of return. Namely, when the compound interest rate of return is certain, the more fluctuated of actual rate of return, the bigger arithmetic average of rate of return. If the compound interest rate of return is fixed, the arithmetic average of rate of return trends to increasing along with the fluctuation of actual rate of return increased. This may be causation for normal result of CAPM test, which said that the relationship between rate of return and risk matches the market.

This also explains why some people eventually lose even though they thought they get more than 50% chances to win when trading in financial market. They always are confident in their judgments, and a tiny mistake would make a huge difference, as an inevitable result of mathematic outcome.

2） Revision of CAPM cash flow

Among the assumptions in CAPM model, it is assumed that the covariance between the yield distribution and the rate of return of risky assets is fixed. However, the symbol of risky assets is its future cash flow distribution. The yield distribution means the rate of cash flow distribution and current asset's market price. Before we get the equilibrium price via CAPM, yield distribution should be an unknown number. If we assume yield distribution is certain, which equals to the fact that equilibrium price is certain, and then this equilibrium price should not be affected by other risk factors.

Namely, the risk factors would be disregarded from the model, at the same time, CAPM would underestimate the risk. Thus, Roll's criticism to CAPM was a tautology.[25]

The correct way is to fix the cash flow distribution of risky assets and not fix yield distribution in the assumption, then the risky assets' rate of return covariance would not be certain.

Allowing for the assumption adjustments above, the classical CAPM capital market curve will not exist anymore. In CAPM model, non-risk assets are the only assets that can be supplied unlimitedly, because central bank acts as the ultimate supplier. Except for the non-risk assets, other assets are finite in the market and their price is uncertain. If all the assets were unlimited, the assets supply curve would be horizontal, which means that the price would be influenced by demand and the CAPM-set price would become nothingness. CAPM is equilibrium price, which is determined by supply and demand, with the prerequisite of limited supply and demand. In practice, due to supply's long-term elasticity, a risky asset's supply may change. However, this is a totally different story to the short-term unlimited supply.

On the curve of CAPM capital market, risky assets portfolio's covariance and rate of return can be certain even though the proportion of risky and non-risk assets may change at will. This violates the quantitative restraint of risky assets. For instance, if people prefer non-risk assets and reduce their holding of risky assets at the same time, in order to move to the end of non-risk terminal of capital market curve, the price of risky assets portfolio would decrease and risk return increase. In the meantime, the risky assets portfolio's covariance of rate of return would also change. At this time, the capital market curve would definitely move and vice versa. As a result, there could not be a capital market curve that allows people to freely choose their investment proportion.

Then we assume the future cash flow distribution and its covariance are certain, instead of risk return distribution and its covariance are certain, so we can get the following derivation：[26]

$$p_i = \beta\sigma_{iL_M} + E(j_i)/r \quad (10)$$

[25]Richard Roll, "A Critique of the Asset Pricing Theory as Tests", Journal of Financial Economics, March 1977: 129-176.

[26]Detailed derivation referred to Jianbo Cheng, "On the systemic science on nation's economics", China Social Science Press, 2015.8, P163.

In equation (10), p_i is risky asset if's equilibrium price. E is risk preference coefficient, the more E less than zero, the more risk aversion is the market and vice versa. When E is zero, the market is risk neutral. j_i is risky asset i's cash flow distribution. r is risk-free yield.

σ_{iL_M} 's L_M is the rate of risky assets portfolio's cash flow j_M and expected value of cash flow $E(j_M)$ (it could be named as the unit revenue of risky assets portfolio, because $E(L_M)=1$), then:

$$L_M = \frac{j_M}{E(j_M)} \quad (11)$$

So σ_{iL_M} is the covariance of risky asset i 's cash flow j_i and the unit revenue of risky assets portfolio, also could be called as risky asset i's systematic risk.

We can get the price earnings ratio formula from equation (10):

$$F_i = \frac{p_i}{E(j_i)} = \beta\sigma_{L_iL_M} + 1/r \quad (12)$$

We can also measure and calculate current market risk preference coefficient based on present market data:

$$\beta = \frac{F_i - 1/r}{\sigma_{L_iL_M}} \quad (13)$$

Based on revised model, equation (10) inform us that market risk preference coefficient E has an influence on asset's equilibrium price, so as to play a role in deciding the risk return and its covariance. This matches the reality in practice.

From equation (13) we could know that when risky assets' price earnings ratio and risky assets' unit revenue systematic risk (Not rate of return's systematic risk, because there is no price variable in unit revenue, so it could be measured without price. Rate of return cannot be measured without price due to the existence of price variable) are given, we can get the risk preference coefficient of assets market.

4.4 Some concluding remarks

According to the calculated risk preference coefficient E, investors can make the decision of whether to enter the market. Government can also figure out if there are economic bubbles based on the risk preference coefficient, so as to take the corresponding macro-control.

From the perspective of quantitative analysis, assets' quality and the health of macro-economy environment determine risky assets' future cash flow distribution. The improvement of assets management and better macro-economy will benefit risky assets' cash flow effectively and then make risky assets' equilibrium price increase. Additionally, ripples in macro-economy will cause volatility in risky assets' future cash flow and fluctuation in its equilibrium price. Furthermore, when cash flow distribution is given, the equilibrium price will vary from different market risk preference. So a reasonable lead of market anti-pressure ability will affect equilibrium price. Finally, the structural relationship between different assets determines that assets price is related to other assets' cash flow relevance.

The revised model illustrates that only when market risk preference, assets future cash flow distribution, and cash flow structural relationship are given, CAPM's systematic risk cannot not be avoided (Because the foregoing three factors are CAPM's inherent systematic risk, when these factors are certain, the systematic risk cannot change). However, macro-control can make some difference on all these factors that can influence equilibrium price (Even though accurate adjustment is unrealistic, and purposeful impact is enforceable). Thus, after our revision of model assumption, the unavoidable systematic risk in CAPM becomes avoidable. If we can secure the stability of macro-economy, make a good direction of capital market anti-pressure ability, and improve economical structure, the systematic risk of capital market can be reduced effectively. Certainly, because of the complexity of economic system, it is impossible to avoid all risks and eliminate assets cash flow fluctuation to zero. However, the impossibility and whether CAPM's systematic risk is avoidable are two entirely different matters.

It is not strange that, in the Chinese security market, stock index compound interest average rate of return is lower than that of the national debt. Because when market risk preference E is uncertain, there is no CAPM nexus between asset returns and its systematic risk, namely, there is no capital market curve. It means that pension fund investment shall not follow CAPM's investment rule rigidly, and there is no necessary connection between high systematic risk and high rate of return. A good investment should be companied with evaluation and prevention of the whole systematic risk.

While using VAR method, we compute the maximum loss under the confidence level of 95% and the proportion of the portfolio risk aversion. The results further prove that the portfolio of social security funds works effectively. The absolute amount of investment loss is tremendous due to the huge investment funds. There is no direct relationship between the holding time and investment risks, which indicates that the investment portfolio cannot balance safety and profitability very well, the safety principle takes the first priority in the operation of the investment. All above amply demonstrated, the national social security fund portfolios attach great importance to risk, especially paying attention to the security. But from another perspective, it shows that the asset profitability is not high. On the one hand, we found that using the capital asset pricing model to calculate the national social security fund investment risk is irrelevant with the system risk, that explains the national social security fund avoid the investment risk to a great extent. Using the VAR method to measure the largest loss of national social security fund investment risk under the confidence level of 95%, and the proportion of the portfolio risk aversion, proves that the national social security fund investment portfolio is effective further. On the other hand, by investigating the relationship between the holding period and investment risk creatively, we find there is no obvious linear relationship between them. Investment risk and return do not change a lot when the holding time changed. This suggests that the national social security fund pays too much attention to the security, and do not reach the expected level on the controlling of short-term investment risk.

The control effect of social insurance fund investment risk is better, so we can increase the social insurance fund assets value-added space on the basis of security. According to the domestic and international economic environments, it may be useful to increase investment limit step by step, discuss iteratively, use different methods to measure the risk, and compare with the return, then ensure the low risk of social insurance fund investment in the first place.

In conclusion, the core of this project is the reassessment of the reasonableness of MAI's stipulation of investment list and proportion, to establish the measurement method of market risk preference and risky assets systematic risk, then to provide a quantifiable index for pension fund investment management institutions and regulators, so as to make contributions to prevent systematic risk.

Understanding the role of governmental agencies and their subordinate organizations in the supplying of social insurance fund is important, particularly, for the purpose to find the institutional problems and propose solutions to coordinate the funds.

V. The risk control Methodology

China's pension reforms are ambitious and necessary given that the preceding system was inadequate for the new economic environment. Taking into account the size of the country and the significant regional differences across the country, implementing the new system is a considerable challenge. This may be the main reason why the government has focused on developing a formal pension system in urban areas in the first place. By comparison, with its very low coverage, the rural pension system has not seen far-reaching reforms.

5.1 The risk control of the National Social Security Fund

The reason to coordinating and cooperating with the National Social Security Fund (NSSF) is that a large amount of provincial social insurance fund assets are being managed by NSSF now. For instance, from 2012, Guangdong and Shandong Province mandated NSSF to invest their RMB 200 Billion social insurance fund.

The NSSF is a supplementary fund of China that is used for social security, and National Council for Social Security Fund manages the fund. As a government-controlled investment fund established primarily to provide a reserve of funds for China's social security system in the future when demographic challenges become the worst. As the NSSF have a long history of 17 years investment, it has rich experience in risk control albeit their lows return of 1.76% in 2016.

As market instability increases uncertainty, the NSSF put the investment risk in a more prominent position by strengthening management and preventing risk. The method could include onsite check of important investment projects, hold symposium on the macroeconomic and capital market analysis by managers, and strengthen the daily check for various investment guidance and monitoring. To optimize the design of the entrusted investment products, the NSSF is improving the assessment and evaluation system of entrusted investment, highlight the long-term results and performance stability evaluation guidance. So as to improve the risk management and control, and to prevent risks effectively, the NSSF is strengthening the fund investment supervision and compliance review, as well as strengthening risk monitoring , early warning and internal audit among others.

5.2 The importance of social insurance information in risk control

In an era of Big Data, the importance of social insurance information is becoming increasingly important. In order to coordinating and integrating social insurance information, and to control risk, the pension fund managers should:

Analyzing social insurance fund information sharing system for policy makers and NSSF, in order to design information-sharing system for operational authorities and management institutions;

Analyzing social insurance information sharing system for fund managers in order to design information-sharing system for multiple authorities and levels;

Proposing information sharing program for operators, especially how to improve standard making and mechanism adjustment of social insurance fund information and how to strengthen dynamic management of social insurance fund recipients by using big data and shared information. In this respect the Centrelink System of Australia is a good example to learn.

5.3 The role of Social insurance authorities in Risk Control

The issue here is how to build up work cooperation mechanism for social insurance fund management and risk control regulation among provincial authorities.

While the system for the urban areas has been legislated, implementation is ongoing. Reforms aim to tackle two main issues, namely refilling of empty accounts in pillar 1B and the introduction of occupational pensions through the Enterprise Annuity system. It should be noted that even between urban areas, there are considerable differences that hinder the implementation of Enterprise Annuities. Regional disparities in tax rules for Enterprise Annuities and the uncertainty regarding their future development are among the biggest obstacles to the system's acceptance and diffusion. At present, large enterprises are the main participants in the system. At this point, small and medium sized enterprises seem to be hesitant to participate. To realize the goals of the reforms, the basis of the new system needs to be developed, and much of its success will depend on future regulations.

China’s second pillar covered only 6.4% of companies’ employees. In the Decision of the State Council on the Reform the Old-age Insurance System for Government Bodies and Public Institutions (Guo Fa [2015] No.2), the civil servant and public service unit will set up a compulsory occupational annuity system. The employer should pay at 8% of the salary while the individual will need to pay 4%

of their income.[27] As measured by Dr. Jin Weigang, the director of the Social Security Research Institute, Ministry of human resources and social security, there are about 30 million public employees take part in occupational pension. According to the design of the system, the annual premium is about RMB 260 billion, but because the contributions of civil servants and full funding institutions are bookkeeping, so the real premium is about 150 billion. [28] China's second pillar pension assets of enterprise annuities and occupational annuities will increase in the coming years and play an increasingly important role in capital market. For this reason, the development in compulsory enterprise annuity can help firms to build their annuity, and the growth of private pension in China will herald new opportunity to accelerate the country's capital market development and financial stability. On 6 December 2013, China's Ministry of Finance, the State Administration of Taxation and Ministry of Human Resources and Social Security published the No.103 document to guide the investment of enterprise annuity and occupational pension. The employer's contribution to enterprise annuity and occupational pension will get income tax relief; the personal contribution portion paid by an individual shall be deducted from the taxable income of the individual in the 4% part of the taxable base of the personal contribution wage.[29]This kind of preferential policies will benefit future private pension development in China.

For the local social insurance fund, this article research conclusion also has a certain reference value. Local social insurance fund can draw lessons from the national social security fund investment, and try to use the model and method to expand investment channels appropriately, create more benefits on the basis of ensure the safety.

Finally, build the system of social insurance funds portfolio insurance. At present, there is no law in our country to provide remedial measures for the loss by entrusted investment, so it is time to establish relevant system of social Insurance fund securities investment Insurance(Investor Insurance Scheme, IIS).We should establish the system of social insurance fund securities investment insurance from setting up laws and regulations, building safety mechanism to protect social insurance fund and formulating premium collection standard to perfect the social insurance fund portfolio insurance system gradually.

[27] The State Council, Decision on the reform the old-age insurance system for government bodies and public institutions, (Guo Fa [2015] No.2), 3 January 2015.

[28]See: Dr. Jin's speech at: http://www.sohu.com/a/195647132_759437

[29]See at: http://szs.mof.gov.cn/zhengwuxinxi/zhengcefabu/201312/t20131206_1021661.html

It is worthwhile pointing out that our work has several limitations that still need to be addressed. According to the limitations, our future research for social insurance funds solvency risk should **base** on the actuarial statistics, when analyzing provincial social insurance fund's overall solvency risk, eliminate the applications such as government subsidies, introduce wages, retirement age and replacement rate and other factors. At the same time, in accordance with the requirements of the panel data, extract the provincial social insurance funds income, expenditure and balance data respectively, set up standard panel data model, analyze the provincial social insurance funds solvency risk specifically, find out the provinces' contribution to the overall solvency level of the national social insurance fund.[30]

VI. The Pension investment policy suggestions

Based on the above experience of the US, the UK and other countries, as China has not long history in pension investment, the following are proposed suggestions for the investment and risk control methodologies of the pension investment of China.

6.1 Establish the trustees' fiduciary duty in legislation

Almost all the non-systemic risks are related to the investment mangers' violating of fiduciary duty. In November 2017, the People's bank and other financial regulators jointly issued the document named "Guiding opinions on regulating the asset management business of financial institutions (draft)", require all asset management institutions include banks, trust companies, securities, mutual funds, futures, insurance companies, asset management institutions and other financial institutions, all the investment managers must fulfill the management duties in accordance with the principle of diligence, more embodies the basic principles of trust law; the asset management business' supervision will play an instructive role. After the document's formal implementation in the future, China's asset management industry will usher in a unified regulatory standard, and one of its cores is that these financial institutions must fulfill their fiduciary duties as trustees. As pension investment is a typical asset management, the formal document will be a necessary guidance.

Based on liquidity financial assets, pension funds should be managed flexibly according to the rapid changes in the financial market. Therefore, pension contributors as a client entrust the assets managers with enough discretions to trade, and the assets managers must be bound by the fiduciary duty. The

[30]**Tang, DP, Zhai, LP.** ***Empirical Analysis of Investment Risk of Social Security Funds--Evidence from Chinese Stock Market Data*****, Economic Management Journal, 2014.**

obligation of legal concept is mandatory and non arbitrary. The obligor who has obligations has no choice but to deny or ignore it directly. The fiduciary duty was divided into the duty of loyalty and the duty of care; if the trustee violates the fiduciary duty, the client has the right to require the trustee for damages to compensate for the loss, or compensation for the trustee breach of fiduciary duty and loss of revenue of course, can also ask the trustee to return all the benefits obtained by violating the fiduciary duty.

The duty of loyalty represents the prohibitive side of fiduciary duty. It requires the trustee to realize the best interests of the beneficiary, only to act as a "sole interest" of the beneficiary, so as to solve the potential conflicts of interest between the trustee and the beneficiary. The duty of loyalty principle prohibits all trustee self transaction, the trustee cannot profit for himself or any third people; even if the client agrees to such transactions, also must satisfy the requirements of the protection of certain procedures and entities, including the provisions of the trustee of the transaction for a full and fair disclosure obligations.

The positive connotation of the obligation of fiduciary duty is reflected by the duty of care, which measures the degree of attention of the trustee by setting a reasonable or prudent standard. The standard is objective and is determined according to the practice of the industry and the practice. If a trustee has professional skills related to the entrusted business, the duty of care is based on a rational and cautious businessman who possesses his professional skill.

Due to the lack of the legal tradition of trust law in China, the study of trustee's duty of loyalty is not systematic in the legal transplantation of trust law. In reality, a large number of trustees failed to fulfill their duty of loyalty in the judicial practice of financial asset management. The related laws and regulations of pension management is the "trust law", the pension contributors have entrusted to the property assets managers shall bear fiduciary duty in accordance with the law, which is entrusted by the pension contributors, the fundamental value of faithful. The section 148 and 149 of China's company law stipulated that the board directors, supervisors and senior management personnel of the company bears the duty of loyalty and diligence, in violation of the duty of loyalty to the company act of income shall belong to the company, to the company made losses shall be liable for compensation.

As trustee, the pension managers will face the temptation to manipulate the market and get potential benefits when he is in management, which is contrary to his duty of loyalty to get the best interests of the beneficiary. If there is no compulsory duty of loyalty to supervise and restrain the behavior of the pension manager, the possibility of beneficiary's interests will be greatly improved. From the point of

view of protecting investors, the policy maker should further improve the supervision and restriction mechanism for pension managers. With the continuous progress of information technology industry, regulators are more sensitive to pension managers' behavior monitoring and faster reaction. The application of big data system and public opinion analysis system will reduce the regulatory cost.

There is an old saying in China: Try one's best to do what was entrusted to him by others, which is very near to the fiduciary duty. The industry of assets management is young in China, so one of the most important tasks is establish the fiduciary duty concept or philosophy of the whole industry. So the policy suggestions are the amendments to the existing securities law and trust law, proposed all parties in the trust relationship framework of pension management. The truly implement the trustee's breach of fiduciary duty caused losses to investors, shall be liable for compensation to investors in accordance with the law. Pension managers act as trustee, their fiduciary duty is the first step, as well as the most important basement in their whole professional career.

6.2 Setting up the strategy of the index investment of pension

What kind of strategy the pension investment chooses has played a decisive role in the value and value of the pension, so it is very important to study the investment strategy.

Some scholars' research indicates that pension fund returns cannot exceed market returns, for example by Beebower and Bergstrom (1977), who studied the portfolios of 148 pension funds in the United States from 1966-1975. They used the CAPM model to calculate the sample's Jensen alpha and found that the pension funds' returns were lower than the S&P 500 by 144 percentage points.[31]Similarly, Brinson, Hood and Beebower (1986) analyzed 91 US pension funds and found that their return was lower than the S&P 500 by 1.1 percent; on average, 93.6 percent of the variation of actual quarterly total returns from 1974 to 1983 of a sample of 91 large corporate pension plans could be explained by using proxy return series.[32] 20 years later, the problem remains: why the institutional pension clients spent so much time and effort in manager searches but so little time in reviewing their asset allocation policies? It was not as if all the clients had identical risk tolerances, liability streams, and funding policies. Pension clients should carefully consider what goal they are trying to achieve, how much risk

[31]Beebower, G. and G. Bergstrom, 1977, *A Performance Analysis of Pension and Profit Sharing Portfolios: 1966-1975*, Financial Analysts Journal33 (3), 31-42.

[32]Brinson, G., L. Hood, and G. Beebower, 1986, "Determinants of Portfolio Performance", *Financial Analysts Journal*, 47 (3), 231-262.

they are willing to tolerate in pursuing it. Then, create a policy portfolio that reflects that goal and their risk tolerance for the probable outcomes.[33]

The above scholars' research shows that human managed investment funds cannot defeat the stock market index for a long time. This conclusion is a summary of the experience of a large number of fund managers in the United States and other countries, and is also a consistent conclusion of the empirical research in the financial field for decades. The investment strategy has many advantages, which will be best in the long run and completely eliminate speculative stock selection. Therefore, passive index investment should be one of the best choices for pension funds. It is an investment strategy which has been proven effective for a long time, and its transaction cost and management cost are the lowest. Some people think that index investment may not be suitable for China, because there are few listed companies worth investing in China. But if the pension has to invest in the stock market, there should be no choice but to invest in the listed companies in China. It was also suggested that we should invest in the index representing the blue chip stocks, such as a Chinese top 100 stock index, rather than invest in the weighted composite index representing all the listed companies. But who is sure that these companies don't have a problem? Today's performance and financial situation represent only the past performance of listed companies. In investment history, a stock often falls to no one's need. Later, it will be the best investment entry point if we look back later. So, although we all want to be able to judge the good and bad of each stock based on the performance and data we see today, history proves that it is difficult.

Therefore, the strategy of pension investment policy recommendations is: to avoid the short-term effect, should treat investment from a longer perspective; avoid the fund manager recommended the so-called "value investment", not to judge what company is investing in blue chip or bad performance, but the weighted composite index includes all listed companies. The past long performance of China's economy has been one of the best in the world; reflecting the macro-economic index of comprehensive weighted index, it can become an important target of pension investment. Because of the large amount of pension, only the investment in the index funds has the smallest impact on the stock market, which is conducive to the stability of the capital market.

6.3 Give the pension managers longer contract

[33]Hood, L.R., *Determinants of Portfolio Performance: 20 Years Later,* Financial Analysts Journal, 2005, 61 (5): 6-8.

Pensions are a form of savings, allowing individuals to smooth their income over time in their whole life; rational individuals might calculate the optimal consumption and savings. According to Diamond (1977), the need for a public pension policy associated with the risk of a varying length of working life. [34] So the pension investment managers must meet the long time needs of pensioners.

According to Interim Measures for Enterprise Annuity issued by the Ministry of Human Resources and Social Security in 2004, and the amended Enterprise Annuity Measures began the implementation on 1 February 2018, when the enterprise annuity plan is formulated, it must be collective negotiated and submitted to the staff congress. The enterprise annuity Council is composed of enterprise representatives, staff representatives and external experts, but the representatives of employees can not be less than 1/3. The enterprise annuity plan needs the staff representatives to decide, even within one year, the staff representatives cannot endure the enterprise annuity losses even in a single year, the short-term management of pension managers is unavoidable, that is, more investment in treasury bonds and other "safe" products. Therefore, compared with other investment products, the investment style of the enterprise annuity investment manager has been relatively conservative, and the scale of its investment stock has not reached the upper limit of 30%.

In the future pension management, one of the most important risk control methods is the risk attitude. The risk control policy is based on the general behavior of the pension investment manager. How to guide the risk neutral of managers is one of the important goals of venture investment. Risk preference and risk aversion are not suitable for pension investment. Because security is the foundation of pension investment, almost all pension managers are unwilling to take risks, because their adventure activities cannot get extra incentives. But excessive risk aversion is more common in the real world. Only long-term investment, the enterprise annuity can overcome the short-term market price fluctuations. Pension is characterized by a long-term investment that can last for 30-40 years. Short term risk aversion is a long-term high risk. Therefore, the policy proposal is to give the pension investment managers a long term contract to make up the gap between the low income and the short term.

6.4 Suggestions of Earning-risk of the pension investment portfolios

[34]Diamond, P. (1977) “A Framework for Social Security Analysis,” Journal of Public Economics, 8, 275-298.Bodie, Z. (1990) “Pensions as Retirement Income Insurance”, Journal of Economic Literature, vol. 28, March 28-49.

The portfolios theory of Markowitz (1952) described that the investment risks can be reduced when different varieties of investment instruments are pooled together. However, as price changes of Chinese stocks have a high volatility, it is less important to "select equities", for it is difficult to scatter risks only to pool together different stocks.

Hu (2014) calculated the portfolio investment combinations of the three investment instruments, namely equity, Treasury bond, and bank deposit in Chinese capital market, almost fit completely the capital asset pricing model (CAPM). We know that the equity itself indicates intrinsic risk; on another hand, as a new stock market, China has fluctuations much acute than those of mature markets by a standard deviation of yield over 40%. After the global financial crisis, investing pension funds into equity is a reasonable behavior, which is necessary for the principle of profitability but which means having to face certain risks. The equities represented by Shanghai Composite Index (SCI) Fund have the highest yield among those three investment instruments, in the mean time SCI Fund has the highest risk (measured by standard deviation of yield), far higher than that of Treasury bond and bank deposit. If the pension funds want get more earning, approximately 0.4% increase of expected yield will be acquired when the standard deviation as risk measurement increases by 1%; i.e. an increase in expected earnings per 1% means a 2.5% increase in risk. [35]

Due to the high volatility of Chinese stocks, the portfolio selection is not so important, passive investment strategy is a better choice; pension funds could invest into Shanghai and Shenzhen 300 index funds. So the policy suggestion to the pension managers is that: the capped of investment of equity is 30% according to the basic pension insurance fund investment management approach; if exceed 30%, the pension managers must focus on the risk-earning issues. According to Hu (2014), Therefore, the equity investment will not exceed 40%.

6.5 How Pension invests overseas to eliminate "Home Bias"?

As an emerging market economy, China is at the beginning of its reform and opening to the world on its domestic capital market. The speedy development has made China an economy with the world's largest foreign currency reserve, and an investor with increasing ability to invest overseas. Therefore, although now no program of overseas investment is available for pension funds (except the National Social Security Fund, NSSF), such issue of overseas investment shall be probed into to eliminate "Home Bias" and to diversify the risks intrinsic to investment confined in the domestic capital market.

[35]Hu, Jiye, "An empirical approach on regulating China's pension investment", European Journal of Law and Economics, Volume 37, Issue 3, 2014.

Free flows of capital across borders promote a more efficient allocation of world resources by allowing savings to find their most productive use beyond their national borders. China's currency, Renminbi, is also facing pressure of appreciation in the international financial market, Significant outward investment of pension and other exchange funds will help offset surpluses on the trade account, although investment returns will need to take account of the negative impact of likely currency appreciation.

When pension invest overseas, S&P500 is one of the best choice, one reason is that it has a low relevancy factor with SCI, lower than FT100, HK Hang Seng. So we can use S&P500 as a reference index for overseas investment which will minimize the risks intrinsic to investment constrained in the Chinese domestic stock market, and the best choice for eliminating "Home Bias". Another reason to select S&P 500 is that the United States is the largest economy in the world; its capital market is big enough to bear the large amount of China's pension funds.

So the pension investment policy suggestions on overseas is that: China could attempt to invest some foreign markets like the relatively mature S&P500 of the US, HANG SENG of HK, and FTSE 100 of the UK as the target indices. From this point of view, international investment can be an option when in the future Chinese pension funds are allowed to invest in the capital market to reduce the risks arising from investment, which is limited to the domestic market. Some degree of removal of "Home Bias" means a reduction of single country risks.

Investment Strategies for LGPS Funds in the UK

A look at current strategic investment allocations and new policies on asset pooling in the UK's biggest public sector pension fund

Assessment Report

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Contents

Abstract

All social security funds and most occupational pension schemes for UK public sector workers are organized on a pay-as-you-go basis funded from taxation. The most important exception is the Local Government Pension Scheme (LGPS) covering local government workers consisting of 89 separate funds in England and Wales, 8 in Scotland and 1 in Northern Ireland and with total assets of £240 billion. The LGPS is a defined benefit scheme (DB) which has the general objective of being funded at 100% of past and future service liabilities evaluated in triennial (three yearly) actuarial valuations. Employee contributions are fixed by law leaving the balance of any actuarial deficit to be met by employer contributions and investment returns. Employer contribution have steadily risen over the past decade and given the real cuts in local government budgets, both central government and local governments are pinning their hopes that the current actuarial deficits are eliminated through strong investment returns.

LGPS funds have been invested across the traditional asset classes of equities (shares), fixed interest bonds and property since the 1960s. However the low interest rate environment in the aftermath of the Financial Crisis and the volatile nature of the equity markets, have made LGPS consider other forms of alternative investments in private equity, hedge funds and infrastructure to achieve higher net returns. To help facilitate achievement of this objective the Government has proposed creating larger pools of LGPS which while guaranteeing each fund's autonomy in its investment strategy will cut the cost of investing in these all investments, but especially alternative investments where fund scale is important to achieve lower cost. These large pools are currently being established and it will be the mid-2020s before this approach can be properly evaluated.

The formation of larger investment pools coupled with a relaxation in investment allocation controls may offer the chance for Chinese social pools associated with the urban scheme for enterprise employees to achieve higher investment returns although the demographic situation with pension benefits exceeding contributions in many provinces has reduced the window of opportunity compared to the situation of 15 years ago.

Introduction

UK national social security works on an entirely pay-as-you-go basis with funding for the State pension scheme primarily derived from employer and employee contributions to the National Insurance Fund. There is no social security reserve fund. The NIF balance is invested together with the net balances of the Consolidated Fund which in the past two decades have been generally negative. The Debt Management Office (DMO) of the UK Treasury is tasked with obtaining the lowest sustainable debt management costs. To the extent that there are positive balances in the NIF these merely reduce the overall amount and cost of UK Government borrowing.

Similarly the occupational (second tier) pensions of the Civil Service, the NHS, Police, Firefighters and Teachers are all managed on a pay-as-you-go principle with no reserve funding.

However there is one major exception in the UK public sector to the pay-as-you-go principle. This concerns the second tier pensions of local government workers and a large number of other autonomous public agencies, most of whom were at some point in time an integral part of local government but were subsequently spun off and corporatized as public sector agencies or even independent private companies. The Local Government Pension Scheme (LGPS) is a long established defined benefit scheme dating back to the 1920s[36], and is administered by 89 local government pension authorities in England and Wales. A separate but similar Scottish scheme is administered by 8 Scottish local government authorities and overseen by the devolved Government of Scotland (Scottish Executive)

Taken as a collective whole LGPS is one of the largest pension schemes in the world with assets under management of £240 billion and around 5 million members. Given its generous defined benefit nature , its long term funding challenges and its relatively permissive investment environment, it offers interesting strategic options to the Government of China in improving its investment income as the workforce declines from its peak and growth in contribution income cannot be relied upon to ensure fund revenues and expenditures remain in balance.

The remainder of this paper will focus on the England and Wales LGPS because the scheme is currently the focus of several interesting developments intended both to reduce cost and increase in a challenging investment environment.

Section 1 will briefly summarize the main aspects of the LGPS. Section 2 will explain the statutory and investment requirements for the LGPS. Section 3 will look at funding strategies and the proposals currently being enacted to reduce cost and increase investment income. Section 4 will briefly summarize the implications for China.

[36] The first scheme set up by legislation was by the City of Manchester in 1921. The Local Government and Other Officers Superannuation Act of 1922 allowed local government authorities to set up pension schemes. The Local Government Superannuation Act (LGSA) of 1937 made pension provision compulsory and the LGSA of 1953 extended benefits to widow's pensions and provided for lump sums.

Section 1: Overview of the LGPS

i) Membership structure of the LGPS

The LGPS consists of 4 groups of employers.

Group 1 consists of local government authorities (county councils and district councils)

Group 2 consists of centrally funded public sector bodies, most of which used to be run by local government but are now independent with direct central government funding. These include school academies, sixth form and further education authorities and higher education corporations (formerly polytechnics)

Group 3 consists of other public sector bodies such as a National Parks authority or the Environment Agency

Group 4 consists of private sector or voluntary sector organisations, many of which originated in local government such as passenger transport executives, urban development corporations and tenant management organizations

Group 1 contains 78% of the members but only 22% of employers. Conversely group 4 has 6% of the members but almost one third of all employers.

The employee membership is divided between active contributors, pensioners and deferred members illustrated in the table below

Table 1: Membership of the LGPS

	Group 1	Group 2	Group 3	Group 4	Total
No of employers	**4,942**	**4,546**	**1,546**	**4,685**	**14,435**
Contributing employees	**1,414,005**	**342,364**	**73,107**	**113,341**	**1,942,817**
Retired Members	**1,299,919**	**98,348**	**46,112**	**98,718**	**1,543,097**
Deferred Members	**1,528,822**	**212,321**	**56,386**	**102,430**	**1,899,959**
Flexible Retirement	**8,964**	**566**	**270**	**804**	**10,604**
Total Members					**5,396,477**

Source: LGPS Annual Return – DCLG (2016)

The current active members to retirees ratio is 1.26 to 1, and the number of new contributors in 2015-16 of 50,000 was just about matched by the number of retirees. However the deferred members constitute a large inactive group of potential retirees. Pensions drawn by this group increased from just under 15,000 in 2006-07 to 30,000 per annum in 2015-16. Therefore in the next 10 years it is highly likely that pensions drawn by this group will drive the contributor to retiree ratio much closer to 1:1

ii) The LGPS Benefit Structure

Prior to 2008, the LGPS operated a basic benefit structure based on a maximum 40 years of service that granted pensioners on normal retirement a lump sum of 3/80ths of final salary and 1/80th as an annual pension for every year of completed service. Therefore a retiree completing 40 years of service would have a lump sum of 1.5 times his final annual salary and a pension of half his final annual salary. Other benefits included lump sum payments for death in service and an annual pension for spouse and child dependents and regulations for taking retirement with pension on ill-health grounds

In 2008 the benefit structure was modernized to reflect the impact of a changing retiree-member ratio, and the reality that it was less likely members would complete full years of service. The obligatory lump sum was scrapped although 25% of the pension can still be commuted to a lump sum at a conversion rate of £12 of lump sum for every £1 of annual pension. The annual pension denominator was reduced from 1/80 to 1/60, therefore increasing the amount of pension for each year of service. The lump sum for death in payment was raised from 2 to 3 times and the minimum age to take early retirement on pension from 50 to 55.

Further changes were made in 2014 with the normal retirement age being raised from 65 to be in line with the slowly rising State Pension Age. The pension denominator was further reduced to 1/49. Members were also allowed the possibility of a half the cost half the benefit scheme (so called 50:50) which would increase the benefit denominator to 1/98. Crucially the final salary was replaced by a career average with historic salaries being revalued by the rate of inflation (Consumer price index) for all salaries earned after April 1 2014. (Pension rights accrued before this date would be based on the final salary in the year 2013-14 and those after o the career average)

Despite the overall reduction in benefits, the LGPS still represents an attractive defined benefit scheme. There is auto-enrolment of all new local government employees and withdrawal is only possible with less than 2 years of service. Otherwise leavers become deferred members of the scheme who can draw their benefits at statutory approved times.

iii) The LGPS Contribution Structure

Prior to 2008, the LGPS had a single contributory rate for all members 6% of pensionable salary. This led to complaints that the scheme was disproportionately generous to higher paid employees. Therefore a revised contribution structure based on 10 salary bands was introduced. The lowest rate of contribution is 5.5% for pay up to £13,200 and the highest rate of contribution is 12.5% for salaries in excess of £153,301 (basically chief executive officers). The median band (band 3) is 6.5% for salaries between £21,401 and £34,700.

The employer's contribution is a floating rate intended to ensure the scheme is fully funded on an actuarial valuation which is conducted every three years. Currently employer rates are around 15 to 20% of the annual pensionable payroll depending on the local government authority. Overall in 2015-16, employers contributed more than three times the contribution of employees to the LGPS.

In the 1980s and 1990s with high rates of inflation and very high nominal returns, some local government authorities elected to reduce pension contributions to reduce pressure on their recurrent budgets. This was compounded by a decision of the Government to reduce the minimum funding level to 75% of liabilities. This decision was soon reversed but since 2000 and particularly since the financial crisis in 2008-09 which has made the investment climate extremely challenging, most funds are, on an actuarial basis, in deficit.

iv) Overall Financial Summary of the LGPS

The LGPS currently makes a significant surplus of current revenue (contributions and investment) over current expenditures on benefits as Table 2 illustrates.

Table 2: Income and Expenditure for the LGPS 2015-16

Income	*£ 000s*	*Expenditure*	*£ 000s*
Employee Contributions	2,095,923	**Pensions**	7,426,480
Employer Contributions	7,076,023	**Lump sums**	1,811,296
Investment Income	3,587,785	**Other Benefits**	27,961
Transfer Values	471,560	**Admin Costs**	962,169
Other Income	59,484	**Transfers**	557,213
Total Income	13,290,775	**Total Expenditure**	10,785,119
Surplus	2,505,656		

However there is a deteriorating trend in the current balance with expenditure representing only 74% of revenue in 2011-12 but increasing to 81% by 2015-16.

The actuarial position of the LGPS is significantly worse than the present financial cash-flow would indicate. Funding levels generally range between 70 and 93% of past service liabilities and while there was a steady improvement in funding levels for virtually all funds between 2013 and 2016, it should be noted that this occurred at the end of a relatively long upturn in the business cycle with equity valuations close to all time high levels. Table 3 gives the latest triennial actuarial position for March 31 2016 for a selection of funds

Table 3: Actuarial Position of Selection of LGPS Funds

LGPS Authority	Assets at Market Value	Past Service Liabi	Surplus (Deficit) on	Funding Level	Employer Contribution Rate	Employer Contribution Rate

		lities	Actuarial Basis		(primary)	(secondary)
Greater Manchester	17,325	18,696	(1371)	93%	16.7%	2.7%
Cornwall	1,475	1,961	(486)	75%	17.8%	
Croydon (London)	877	1,203	(326)	73%	17.9%	
Wiltshire	1,831	2,246	(415)	82%	19.4%	11.5%
Surrey	3,213	3,892	(679)	83%	15.8%	£44million recoverable
Islington (London)	1,084	1383	(299)	78%	14.7%	4.4%
Cardiff UA (Wales)	1,653	1,952.9	(299.9)	85%	16.6%	6.4%
Merseyside	6,850	8,061	(1231)	85%	15.4%	£129 million

Source: LGPS Actuarial Valuation Reports 2016

It should also be noted that the funding level assumptions are very sensitive to changes in both benefit increases and the real discount rate used. For example in the case of Greater Manchester the difference in the funding level of a 0.1% change in the real discount rate used is 2%; and the impact of a 0.1% increase in benefits would be to reduce the funding level by about 1.5%.

The overall actuarial deficit of the LGPS has been forecast at approximately £45 billion at a funding level of about 80%. It is therefore highly vulnerable both to adverse changes in the investment climate and to changes in assumptions including longevity, early retirement and benefits. This has put considerable financial pressure on both central and local governments who are already operating under conditions of budget cutbacks and 'austerity'. Scheme changes have already been made and further reductions in benefit levels would be strongly resisted. Furthermore with reduced local government budgets, there is an upper limit to how far employer contributions can be raised. Therefore there is now considerable pressure to increase investment returns

Section 2: Funding and Investment Regulations

i) Funding Strategy Statement

In 2007 in the light of difficulties some local government pension authorities were having in maintaining long term fund solvency, the Central Government introduced the legal requirement for LGPS authorities to produce a Funding Strategy Statement (FSS).

The purpose of the FSS was defined as being:

- To establish a clear and transparent fund-specific strategy which will identify how employers' pension liabilities are best met going forward;
- To support the regulatory framework to maintain as nearly constant employer contribution rates as possible; and
- To take a prudent longer-term view of funding those liabilities.

The emphasis in the FSS is on maintaining long term solvency which brings together analysis of the actuarial position, the returns from but also liquidity of investment assets, long term contribution rates and other factors affecting liabilities such as early retirements, changes in employees and employers leaving the scheme or the time deferred members choose to exercise their pension rights.

The FSS therefore includes:

a) The Funding Objective – which is usually a 100% funding level of service liabilities but could be higher in specific cases (for example a margin to take account of future risk and uncertainty in actuarial assumptions)

b) Solvency and long term cost efficiency – this analysis will generate a primary employers' contribution rate which will need to be charged to maintain the fund's ability to meet future service liabilities

c) Deficit recovery plan – which will generate an estimate of the likely amount of contributions needed to clear the existing fund deficit and a secondary employers' contribution rate

d) Identification of main actuarial assumptions and risks

e) A statement of policies on for example on the admission of new employers to and termination of existing employers from the scheme and insurance of some benefits (e.g. ill-health retirements)

The FSS needs to be adjusted periodically to reflect significant changes in actuarial valuations or long term investment policy and strategies

The FSS has conflicting objectives which need to be balanced and reconciled. For example, for most employers objective a) implies low contribution rates, because they would see pension liabilities being "best met" by gaining as much help as possible from the investment strategy over the long term, which would lead you towards an equity-biased investment strategy. By contrast, objectives b) and c) imply stability and prudence of employer contribution rates, which would lead you towards a bond biased investment strategy.

Therefore, the best that can be achieved is a sensible balance between low and stable employer contributions over the long term, accepting that triennial actuarial valuations are likely to lead to greater volatility if higher equity weighted investment strategies are in place.

ii) Investment Limitations

Following the Financial Crisis and the Madoff fraud, the Local Government Pension Scheme (Management and Investment of Funds) Regulations were introduced in 2009, which provided wide investment powers, but subject to certain restrictions. The limits were as follows

- No more than 10% deposited with a single bank (other than the National Savings Bank)
- No more than 15% invested in unlisted securities
- No more than 10% in a single holding (except unit trusts).
- No more than 35% in unit trusts or other collective investment schemes managed by any one body
- No more than 35% in a single insurance contract.

The principal purpose of these restrictions was to avoid the risk of insolvency or massive loss which affected a number of UK local authorities in 2009 through their substantial cash holdings in several Icelandic banks which collapsed following the Financial Crisis. It should noted that the restrictions primarily concerned the vehicles through which investments were held rather than asset classes themselves (with the exception of the unlisted securities limit).

Following the Hymans Robertson report (see part 3 below), in 2016 the Government introduced new Management and Investment of Funds Regulations (2016) replacing the 2009 regulations with the primary aim of allowing pooling of investments across LGPS funds for the purpose in particular of investing in so-called alternative assets (especially infrastructure). This was not possible with the 35% limitation on collective investment schemes.

The new regulatory framework is based on the prudential principle rather than any quantitative limitations. In the context of the local government pension scheme, a prudent approach to investment can be described as a duty to discharge statutory responsibilities with care, skill, prudence and diligence. This approach is the standard that those responsible for making investment decisions must operate.

Regulation 7 sets out six key principles governing investments which are to be explained by each LGPS in an investment strategy statement. They are as follows:

1. Regulation 7(2) (a) - Investment of money in a wide variety of investments

A properly diversified portfolio of assets should include a range of asset classes to help reduce overall portfolio risk. If a single investment class is not performing well, performance should be balanced by other investments which are doing better at that time. A diversified portfolio also helps to reduce volatility. There are no upper limits on investment in asset classes however.

2. Regulation 7(2)(b) - The suitability of particular investments and types of investments

Investments chosen must be compatible with the pension scheme's funding strategy and in particular the requirement to pay pension obligations as they fall due. Thus investment in potentially high return but illiquid assets (or assets at high risk of illiquidity such as certain real estate investment trusts) should be avoided. Investment advice must be sought and return, risk and volatility appropriately balanced in the investment portfolio.

3. Regulation 7(2)(c) - The approach to risk, including the ways in which risks are to be measured and managed

Risks which include financial and demographic need to be properly identified and measured (as far as possible) and risk management strategies put in place. Each LGPS needs to formulate its own appetite for risk within sensible parameters and the overall objective of maximizing investment returns

4. Regulation 7(2)(d) - The approach to pooling investments, including the use of collective investment vehicles and shared services

This was the critical driver behind the introduction of new investment regulations – the need for LGPS funds to be pooled to achieve economies of scale Therefore the Government introduced a requirement that all LGPS authorities must commit to a suitable pool (one of six pools for the 89 LGPS schemes) to achieve benefits of scale. Administering authorities must confirm their chosen investment pool meets the investment reform and criteria published in November 2015, or to the extent that it does not, that Government is content for it to continue.

Administering authorities should set out their approach to pooling and the proportion of assets that will be invested through the pool. This must include the structure and governance arrangements and the mechanisms by which the authority can hold the pool to account.

Administering authorities must provide a summary of assets to be held outside of the pool, and how this demonstrates value for money. The progress of asset transfers to the pool must be reported annually against implementation plans and submitted to the Scheme Advisory Board. Where it is possible that an asset could be pooled in the future, authorities must set a date for review and criteria that need to be met before the asset will be pooled.

5. Regulation 7(2)(e) - How social, environmental or corporate governance considerations are taken into account in the selection, non-selection, retention and realisation of investments

The law is generally clear that schemes should consider any factors that are financially material to the performance of their investments, including social, environmental and corporate governance factors and over the long term dependent on the time horizons in which liabilities arise. Although schemes should make the pursuit of a financial return their predominant concern, they may also take purely non-financial considerations into account provided that doing so would not involve significant risk of financial detriment to

the scheme and where they have good reason to think that scheme members would support their decision.

6. Regulation 7(2)(f) - The exercise of rights (including voting rights) attaching to investments

The long-term investment interests of administering authorities are enhanced by the highest standards of corporate governance and corporate responsibility amongst the companies in which they invest. Poor governance can negatively impact shareholder value.

Stewardship aims to promote the long term success of companies in such a way that the ultimate providers of capital also prosper. Stewardship activities include monitoring and engaging with companies on matters such as strategy, performance, risk, capital structure and Corporate Governance including culture and remuneration.

Administering authorities are encouraged to consider the best way to engage with companies to promote their long-term success, either directly, in partnership with other investors or through their investment managers, and explain their policy on stewardship with reference to the Stewardship Code. Administering authorities should become Signatories to the Code and state how they implement the seven principles and guidance of the Code, which apply on a "comply or explain" basis.

Regulation 8 allows the Minister for Local Government and communities to issue directions to an administering authority if he/she believes it is failing to act in accordance with the guidance. This will only be done after due consultation and other relevant parties and where justified by the evidence.

Other Regulations deal with the definition of investments Reg 2 (which is defined very broadly to include transactions such as options and futures contracts) and how investment manager services must be procured

iii) Investment Strategy Statement (ISS)

Under the new regulations, each administering LGPS authority is required to produce an ISS by April 1 2017. The ISS sets out authority's investment objective, targets, and policies and how it complies with each of the 6 principles set out in Regulation 7 described above. For example it will set out its strategic asset allocation to different asset classes with a target and maximum and minimum ranges, as well as its current investment manager mandates.

It will also identify risks using a value at risk attribution approach which seeks to quantify the risk from a (5%) one in 20 years event occurring. For example Wiltshire CC Pension Fund in its 2017

ISS has identified its total value at risk in a year from such a 1-in-20 event at £495 million, around 27% of its total valued assets in March 2016. The principal risks come from a fall in equity values and a rise in unhedged liabilities arising from a fall in interest rates and/or an increase in inflation.

A crucial element of the ISS is setting out the authority's plans for pooling funds. The collective investment vehicles are currently being established and are planned to operate from April 1 2018. Over the next three years it is expected that most of the investment mandates and assets will be passed through to the new company to manage on behalf of its parent LGPS authorities who will collectively own it. Assets that will not be passed on are primarily illiquid ones or those for which a comparable collective fund does not yet exist. In keeping with Regulation 7(d), the ISS explains which assets these are.

Finally some LGPS funds still retain their own quantitative restrictions. For example the LB of Bromley in its ISS maintained a number of high level investment restrictions (for example limiting all investments in unlisted securities to 10%, in partnerships to 5%, to insurance contracts to 25% , and % of stock-lending of securities to 25%).It also limits the amount of cash that could be kept by the custodian's bank of each fund manager to £2.5 m, mindful of the experience of the bank runs in 2007-08 which closed Northern Rock and the main Icelandic Banks and brought a number of other major UK banks (Royal Bank of Scotland, Halifax Bank of Scotland) to the point of insolvency

Section 3: Investment Strategies

i) Strategic Asset Allocation and the Current Investment Climate

LGPS authorities consider getting strategic asset allocation 'right' as the main determinant for achieving success in their investment strategy. Success is usually defined in this regard as achieving a rate of return exceeding a relatively safe benchmark such as the 10 year rate on Central government bonds (so called gilt securities).

Getting the allocation 'right' means that the balance of assets that is invested in each of the main classes (and sub-classes such as quoted equities in UK, Europe, North America, Emerging Markets etc.) is optimized to take account of the highest rates of return likely on those assets in the business cycle. This is considered to be much more important than getting individual investments right (for example individual stock selection),because on balance the general market trend pre-dominates over that of particular companies. This raises important questions about the role of active investment managers and mandates.

Under 'usual market conditions' (those which existed before 2008), investors would likely be overweight in equities at the beginning of an upturn in the business cycle as equity prices are likely to have been heavily discounted during the downturn and therefore be relatively cheap according to their price/earnings (P/E) ratio. As the upturn develops, P/E ratios rise and interest rates would be expected to rise also as the Government ensures there is not excess credit creation which could spark inflation. Therefore in the normal cycle, one would expect to see an investment strategy that gradually reduces the weight given to equities during the later stages of an upturn and a greater weight given to fixed income securities. This strategy offers the chance to lock in profits on the sale of equities and develop 'downside' protection by locking into higher interest rates.

The business cycle since 2008 however has not been normal. Interest rates have been at historically low levels as Central Banks (including the Federal Reserve, European Central Bank and the Bank of England) have pursued the policy of 'Quantitative easing', a euphemism for incredibly high levels of credit creation. The Band of England base rate did not change for 7 years from 2009 to 2016 from its historically low level of 0.75% and then following the EU Referendum, it was further cut to 0.5%.

These developments have led to two trends. First equities have continued to rise strongly in price so that many are now trading at record high P/E ratios. Many pension funds continue to seek to maintain high allocations to equities even though the risk of a substantial market correction is high and its potential impact profound. Second many pension funds have

sought out alternative investment opportunities especially in infrastructure which is seen as providing stable inflation proof long term investment income[37].

The impact of these tends can be seen in the investment income reported by LGPS funds in 2015-16 compared to 2010-11.

Table 4: LGPS Investment Income 2010-11 and 2015-16

Type of Income	FY 2010-11	FY 2015-16	Change %	Share 10-11	Share 15-16
Dividends receivable	1,708	2,231	30.6	63.4	65.4
Interest receivable	383	320	-16.4	14.2	9.4
Income from property	345	489	41.7	12.8	14.3
Other investment income	259	373	44.0	9.6	10.9
TOTAL	2,696	3 413		100	100

Source: LGPS Statement of Revenues and Expenditure 2015-16 - Dept of Local Government and Communities (2016)

ii) What do LGPS authorities invest in?

Even under the 2009 management and investment regulations LGPS authorities were able to invest in a wide variety of asset classes. These include quoted equities (the largest asset class), fixed income (corporate and government bonds), property (both directly and through certain pooled investment vehicles), and alternatives (which include private equity holdings and infrastructure). The 2016 regulations have removed any quantitative controls so the main objective is to balance four variables, return, risk, volatility and solvency.

[37] Examples in the UK include the new nuclear power plant at Hinckley Point, the electricity of which will be supplied at a price well above the current market price for 20 years; and a new planned crossing over the river Thames east of the current Queen Elizabeth 2 Bridge which will generate toll income for at least 25 years

In the table below is a selection of LGPS strategic asset allocations taken from their 2016 or 2017 ISS with the benchmark allocation given first and the control range given in italics

Table 5: Strategic Asset Allocations

Asset Class	***Equities***	***o/w UK***	***Fixed Interest***	***Property***	***Alternatives***	***o/w infra***	***Total***
LGPS Authority							
Merseyside	53 *(+/- 5%)*	23	18 *(+/- 5%)*	8 *(+/- 3%)*	21 *(+/- 5%)*	7	100
Wiltshire	55 *(-13/+9%)*		15.5 *(-/+2%)*	13 *(-/+2%)*	16.5 *(-/+2%)*	5 *(-/+2%)*	100
LB Bromley	70		20		10		100
Cardiff	69 *(+/- 5%)*	34	18.5 *(+/- 5%)*	7.5 *(+/- 5%)*	5 *(+/- 2.5%)*		100
London Pension Fund Authority (LPFA)	47.5 *(40-60%)*		5 (inc cash) *(0-15%)*	10	40 *(+/- 20-50%)*	7.5 *(5-5%)*	100
LB Croydon	42 *(-7/+18)*		24 (inc cash 1) *(-13/+7)*	10 (+/-5%)	24 *(-14/+21%)*	10 *(+/- 5%)*	100

Source: LGPS Fund ISS

Several things are worthy of note. First all funds have control ranges for asset classes which provides some flexibility around the target benchmark allocation in response to fluctuations in the respective asset class markets. It also enables them to take a more overweight position and a slightly underweighted position in accordance with the business cycle as explained in section 3(i) above. Most LGPS funds do not have a specific target for cash but permit cash holdings up to 10% of the fund in cases of great volatility or the need for solvenct

Second for most funds (LPFA is something of an exception) is the still relatively high provision to equities and fixed interest even though as was illustrated to Table 4 fixed interest in particular has fallen as a share of investment income. The main reasons for this are solvency in the case of both equities and fixed interest and for the latter low risk. Conversely while the allocation to alternatives is growing and is a much more significant share compared to 10 years ago, it still does not attract more than around 15-25% of fund allocations. The reasons are significantly greater risk and the lack of solvency (because hedge funds and private equity are not traded, and funds can be closed)

Third alternatives include significant separate sub asset classes that are quite different from each other. These include not only infrastructure, but also private equity, hedge funds and what is also called opportunities. This is basically one or more funds which are sufficiently liquid to take advantage of sudden market movements (a good example would be investments in precious metals for example).

The cost of investing in alternatives is significantly higher than that of investing in more traditional asset classes. This becomes an issue because while LGPS funds seek to diversify to raise returns, the small size of most funds raises the 'overhead' cost of investing in alternatives significantly relative to return.

In 2013 the Minister for Local Government commissioned a report from the actuarial and investment consulting firm Hymans Robertson (which undertakes many of the triennial valuations of LGPS funds) to investigate how investment returns could be improved and costs lowered.

iii) The Hymans Robertson Report – Main Conclusions

Hymans Robertson (HR) conducted a survey of 18 of the 89 LGPS funds. It estimated on the basis of the sample that in 2011-12 total asset management costs were £790 million p.a. or around 44 base percentage points (bps) or 0.44% of total assets. These costs were comprised of investment costs of 745 million and oversight costs of 45 million. Of the investment costs 95% were related to active fund management and only 5% to passive fund management. Furthermore the management costs did not include performance fees to hedge fund and private equity managers, and did not include the financial transaction costs of buying and selling shares (of which the main one is UK government stamp duty).

HR benchmarked asset management costs against an international peer group of funds and found that the latter were slightly cheaper at 41 bps. However they also concluded that overall fees paid by LGPS were lower than those paid by large peer group funds for similar mandates showing that authorities had some success in driving down costs for external managers.

Conclusion 1: Investment only in Passive Equities

HR drew two main conclusions. The first was that the greater cost involved in the active management of equities was not offset by greater returns. It found that based on a large scale survey of pension fund investments between 2002 and 2011 the cost of investing in passive (so-called tracker funds) was only between 0.01 and 0.1 bps dependent on the particular geographical equity market (North America, Japan etc.) while active investment costs varied from 0.06 all the way up to 1.04 bps. The main reasons for this were the large scale of tracker funds, the number of good managers the fund could be expected to use, the capacity of large funds to match buyers and sellers within the fund thus eliminating transaction costs and finally the far higher numbers of transactions (known as 'churn') in active manager portfolios.

HR investigated the returns from UK pension funds over a 10 year period (2002-11) and found that while there was variation in active and passive returns between different geographical markets, 96% of returns were explained by general movements in equity markets and 0% by active management skill.

What is the level of churn in LGPS equity

It is not possible to know the exact amount of churn in LGPS asset portfolios as the amount of transactions are not disclosed in annual reports. However it is possible to get some idea of its extent from the proportion of sales value in any one year compared to the opening book value. Looking at Greater Manchester, the value of sales to opening value was 61% in 2014-15 and 35% in 2015-16. Wiltshire for the same two periods was 32% and 27% respectively. For the West Midlands in 2014-15 the proportions were 1.7% and 39.8% and in 2015-16 10.4% and 3.6% on its UK and global equity portfolios respectively. Wiltshire performed better than the larger funds recording an increase in market value in both years whereas the Greater Manchester and the West Midlands funds recorded significant losses in 2015-16, and significant profits in 2014-15.

Therefore they estimated that if all LGPS equity mandates were transferred to passive tracker funds, there would be no reduction in returns but a reduction in investment manager costs of 230 million p.a. (13 bps) and a reduction in turnover costs of 190 million (11 bps).

Conclusion 2: Pooling of Assets

Their second conclusion concerned alternative investments. Unlike equities a significant part of the return to alternative investments did arise from active management – 40% according to the benchmark survey referenced above. Furthermore the cost of investing in alternative investments is relatively expensive. This arises partly from the cost of doing due diligence; investment in private equity cannot rely on the Stock Exchange rules and disclosure requirements for quoted companies. Hedge Funds – another popular form of alternative investment which relies on highly leveraged lending – to increase its returns can often only be accessed through what is known as a Fund of Fund approach which imposes 2 layers of fund fees. Third the performance fees for alternative investments are high and are not levied on an ad valorem basis significantly reducing the net returns for small funds.

The UK government was also keen to increase investment from UK pension funds in major infrastructure projects not only to boost pension fund returns but also increase the amount of economic growth from investment spending.

Therefore HR presented options for increasing the size of pension funds to take advantage of these economies of scale particularly in relation to alternative investments. The main options were to either merge pension funds including one single LGPS scheme or to create larger

pension pools through LGPS authorities voluntarily agreeing to create separate but subordinate Collective Investment Vehicles (CIVs). Although pension funds have been merged on a number of occasions in the past, these have generally occurred because of local government reorganization and mergers. HR concluded that the time and cost involved in merger together with the possibility of legal challenge from pension fund bodies and their contributing employees meant that the time and the cost involved in pension fund merger could not justify the potentially larger reduction in cost arising from cheaper pension fund administration. They therefore recommended adopting a pooling approach. The government commissioned a report from PWC consultants on the best way this could be achieved.

iv) Pooling Vehicles

PWC looked at 5 different types of possible collective investment vehicles for pooling.

- Authorized Unit Trust (AUT)
- Open-ended Investment Company (OEIC)
- Limited Partnership (LP)
- Unit-linked Life Assurance Fund
- Authorized Contractual scheme (ACS)

They discounted the LP model on the grounds that it was largely unregulated under UK law as therefore not suitable for protecting LGPS member interests. The United-linked assurance fund was also discounted as a model because the underlying assets would be owned by the investment company and the rights of the LGPS schemes would be those of policyholders.

PWC recommended an ACS as a Qualified Investor Scheme (QIS) with a co-ownership structure established by a contractual deed between the ACS operator (which are to be established) and the LGPS pension fund trustees representing each LGPS Fund. Both the ACS itself and its operator would need to be authorized by the Financial Conduct Authority (FCA).

There were three reasons for this recommendation. First establishing the investment as a Qualified Investor scheme would allow investments in the widest possible types of investment whereas using other types of scheme would limit the types of investment and increase the extent of regulation. Second the ACS model would allow the creation of an umbrella structure with an unlimited number of sub-funds for which specific independent investment objectives and strategies could be set. Furthermore each sub-fund is prohibited from meeting the losses of any other sub-fund and limiting the losses of any LGPS funds only to its investment in those particular sub-funds. This provides important protection to the LGPS funds investing in the scheme particularly where the risk appetite of the funds is different.

Third the scheme is tax favourable. The ACS is not subject to UK Corporation, income or Capital Gains tax and is tax transparent. This means that the tax treatment the LGPS can claim on overseas returns made through the funds is the same as if they owned the overseas assets directly rather than through the vehicle of the ACS. This allows them for example to claim exemption from foreign tax liabilities in countries where the UK has double taxation agreements. Finally management services to the ACS are exempt from VAT which is important since the funds generate no output VAT to offset input VAT.

The most significant tax issue concerns Stamp Duty Land Tax which is levied at 5% on sale value. SDLT seeding relief is available (but not an equivalent tax for Scottish properties) so

that no SDLT applies when properties are initially transferred into the ACS by investors, subject to certain conditions, including:

• ACS units must be issued by investors in exchange for the properties;
• The transfers must take place within a 'seeding period', which expires after 18 months (or by the time of the first third-party investment, if earlier);
• The relief threshold requires a portfolio of over £100m (€116m), of at least 10 commercial properties or 100 residential properties.

However, a claw-back could be triggered by, for example, some or all of the ACS units received in exchange for the initial seeding being transferred or redeemed within three years of the end of the seeding period. The ACS's authorized fund manager is then liable to pay the claw-back, and look to risk-manage this liability, which could result in such ACS units being illiquid for three or more years.

In the 2016 Regulations the Government gave its approval to setting up ACS with an ideal minimum asset pool value of £25 billion. To date 8 proposals have been made as follows

Table 6: Proposed Pools

ACS Name	Investing LGPS	Pool Size bn	Share %
Border to Coast	13 Counties (inc Surrey, Cumbria, East Riding)	36	17
LGPS Central	9 Counties and Metropolitan LGPS (including Staffordshire, West Midlands, Warwickshire)	34	16
Wales	8 Welsh authorities	13	6
Brunel Pension Partnership	10 Southern and SW County funds (e.g. Devon, Wiltshire) + National Environment Agency	23	11
Local Pension Partnership	3 Lancashire and Berkshire County LGPS and LPFA	12	6
Northern Pool	3 Greater Manchester, Merseyside and West Yorkshire	35	16
Access	12 Shire Counties including Kent, East and West Sussex	33	15
London CIV	All 32 London Boroughs plus the City of London	29	13

These are in the process of being approved with a target date of operation April 1 2018. Three of the proposed pools are less than the 25 billion minimum limit. However the Brunel Partnership is only slightly below the limit; the Welsh authorities form a political unit given the devolved Government in Wales and the Central Government has expressed support for the

LPP structure. Therefore it is likely that all 8 structures will be approved and assets will start to be transferred over from 2018.

v) Conclusions on Current and Future LGPS Investment Strategies

The main conclusions are as follows

a. UK LGPS funds generally have a target of achieving a 100% funding level of past and future service liabilities based on triennial actuarial valuations.

b. Currently all LGPS funds are in actuarial deficit although there are significant variations between funds and most funds have improved their funding levels in the past 6 years due to both changes in scheme benefits, lower early retirements and most significantly better investment returns.

c. Given the continuing large UK national budget deficit, real terms cuts in local government spending are likely to continue and therefore the scope for further large employer contributions is limited; employee contributions are set in legislation and given the 1% public sector pay cap in place since 2013 are unlikely to be changed.

d. Therefore investment returns over the long term must play the biggest role in closing the funding gap.

e. The Central Government has traditionally allowed a relatively wide range of investments. In 2016 it brought in new regulations that withdrew all legal quantitative controls on investment, defined investments in a very wide frame (including so-called derivatives such as options and futures, insurance contracts and underwriting) and set out six core investment principles which LGPS investment strategies must comply with.

f. UK LGPS portfolios have included since the 1970s a broad range of quoted tradeable global equities as well as traded fixed income securities. For most portfolios they constitute around 70% of fund assets, with dividends receivable providing the largest element of investment income. The emphasis now is on reducing the managerial costs of running these portfolios by moving from an active to a passive management strategy that is far cheaper, over the long term no less successful and therefore increases returns net of costs. However many LGPS funds on the basis of their 2017 ISS remain committed through sentiment to some element of active management.

g. Since around 2005-06, the major new focus of LGPS investment strategies have been so called alternative investments which include infrastructure, private equity and hedge funds. Allocations to these funds are typically around 20-25% with the precise extent of allocation dependent on LGPS trustees' attitude to risk and the solvency of funds. When pension payments can be paid out of current contributions (i.e. the fund is an accumulation phase), this increases the opportunities to invest alternatives. However LGPS are mindful

that alternative investments are much more illiquid and are more difficult to measure against standard benchmarks

h. In the light of the Hymans Robertson (HR) report commissioned in 2014, the Government has decided that LGPS pension funds should collectively come together to form large pension pools of at least £25 billion to allow for greater scale investments particularly in UK infrastructure. So far 8 pool proposals have been made although 3 of these are for less than the 25 billion limit. If these proposals are accepted, and the necessary administrative arrangements and authorizations in place, most LGPS assets will transferred to the management of these pools from April 1 2018 although it will take at least three years for most assets to be transferred across. It will therefore be until at the middle years of the 2020s until any evidence will emerge for the success of the pooling approach; and that will have to be evaluated against the then investment climate.

Section 4: Opportunities for China

The Chinese Social Security system operates two main DB funds – the social pool for enterprise workers and the funds for employees of public agencies. (The individual account serves as a DC type element, although in the majority of cases this is still unfunded)) These funds were never established as proper actuarial funds to be funded at 100% or close to 100% because of the huge transitional cost of doing so when transferring workers and retirees from the old pay-as- you-go enterprise system. However because of the demographic transition (a bulge in the number of workers created by an overall lower dependency rate) and an aggressive expansion of coverage. Chinese social pools in the enterprise system accumulated significant assets in the late 1990s and early 2000s as contributions significantly exceeded pension payments in many pools.

There were opportunities to allow a significant diversification of pension assets out of Government fixed interest securities. The first was in the early 2000s in the light of the Liaoning pilot and the proposed refinancing of the individual accounts and the introduction of the enterprise annuity system in 2004. The second was immediately following the Financial Crisis in 2008-09 which led to a significant readjustment of equity values in particular and would have allowed pension funds to invest at the bottom of the business cycle and potentially earn significant value enhancement in the consequent upturn. To some extent allowing pension authorities to transfer some funds to the management of the National Social Security Fund (NSSF) allowed some exposure to better investment returns but overall opportunities have been missed. Currently the prospects for the world economy seem more uncertain – global equities appear generally overvalued, fixed interest returns are depressed through Quantitative Easing and low government base interest rates and property (particularly residential property) in many hotspots (Hong Kong, Vancouver and Toronto in Canada, London), seems of a bubble nature.

However there is some truth in the maxim that there is never a good time to jump on the wheel; you simply have to do it and trust that longer term gains eliminate short term losses. The question is how and to what extent.

The pooling approach adopted by the UK offers a practical way forward. While the pension system for enterprise employees has been officially provincially pooled for a decade, in reality large numbers of separate pools exist which are balanced through transfers rather than

through formal merger. At the provincial level, at the end of 2013, contributions exceeded pension expenditure in 13 pools; in contrast in 18 pools contributions exceeded pension expenditure and required financial subsidies to remain in balance. At the end of 2013 nationally contributions were balanced by expenditures, although the situation will change dramatically in the next decade. Nevertheless there are still sufficient assets accumulated in the system (2826 billion Yuan) or about 1 ½ years' total contribution revenue and expenditure that would allow for potential significant investment returns to be made over the course of a normal business cycle.

There are probably 2 ways this could be done. The first, the most straightforward is by increasing access to and participation in the NSSF, and possibly considering allowing pension fund investments in the other three sovereign wealth funds. The second would be to set up large pension pools in the manner of the UK to achieve some scale in investments. Investments should be governed by quantitative restrictions because the 'alternative' investment field is still even more opaque than in the UK. However limitations need to be at a level that would promote legitimate risk-taking. Ideally funded individual account balances would be included with a minimum return guarantee equal to the one year bank deposit rate.

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Pension Fund Portfolio Management:

Risk & Risk Premium, Diversification, Allocation and Governance

Davide Cipparrone, Andrea Canavesio and Giuseppe Spaziante

Executive Summary

Portfolio Management for Pension Funds has become a phenomenon of global interest in the modern economic environment. Pension Funds, representing investors on a worldwide scale, have become increasingly attractive in the financial context as a result of several beneficial services they provide when performing investment activities. At the same time, despite this growing attention, Pension Funds can still be identified as a "black box", and their Portfolio Management decisions may in some cases remain obscure to the average investor, not least as a consequence of the everchanging environment in which they are performed. The interest aroused by Pension Funds Portfolio Management, and the simultaneous lack of clarity surrounding this subject, prompted the need for a deep investigation of their structure and their operations, able to provide a complete and comprehensive understanding of their role in modern worldwide economy. Nevertheless, by virtue of this requirement, a previous study of a set of fundamental aspects Pension Funds have to deal with on a daily basis appears to be appropriate in order to reach the aforementioned objective. As a matter of fact, the aim of this paper can be traced in the clear definition of a framework of key features involved in Pension Fund Portfolio Management activities.

Indeed, any Portfolio Management strategy has to take into consideration the associated risks, defined as any effect of uncertainties on the objectives, primarily focusing on the arising Financial Risks related to the collection of returns as well as the concerns regarding the potential for monetary loss. Moreover, the distinction between Systematic and Specific Risk components, along with the measurement of Expected Return and Volatility, provides a first classification and definition of risks.

Throughout the decision making process, investment strategies necessarily aim to prioritise investors' utility maximization. Consequently, the resulting purpose is to achieve an adequate Risk Premium, namely a proper form of compensation for the amount of risk investors undertake.

Accordingly, Portfolio Modelling decisions are significantly influenced by the configuration of the overall Portfolio's Risk – Return Profile. Therefore, the underlying Asset Allocation strategies should comply with risk mitigation techniques such as Diversification, allowing for a volatility reduction through the spreading of risk among a broad variety of investments within a Portfolio.

Risk Management has become a key component of the broad Portfolio Management process, whose essential purpose consists in the allocation of the "risk budget" in the most efficient way possible and in accordance with the return maximization objective. The development of an Investment Portfolio encompasses a set of interrelated activities, ranging from the formalization of the Objectives and the identification of the Optimal Portfolios on the Efficient Frontier, to the actual Allocation and Composition of the Portfolio in compliance with the Investible Universe's constraints.

As a matter of fact, this Portfolio Management process similarly applies to Pension Funds. Indeed, a Pension Fund's Asset Allocation strategy generally aims to balance risks, returns and costs, while always providing a high degree of Diversification within the Portfolio. At the same time though, it is interesting how the Objectives of Sustainability, Solvency and Adequacy, specific to Pension Funds, feed into the process of Allocation and Management of assets. Correspondingly, the risks arising for a Pension Fund manifest themselves as Asset Liabilities Mismatching, addressed by Pension Funds through strong governance structures and fundamental risk – managing safeguards.

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Financial Risk

Defining Risk

The concept of Risk is central to the financial environment and it requires a clear definition in order to get to a comprehensive understanding of its role in investment decisions and hence on Portfolio Management strategies.

A risk may be defined as the exposure to an uncertain future event, consisting in a deviation from the expected outcome, that can negatively impact the ability to achieve objectives and that can ultimately result in a prevention of value creation. The concept of risk is strictly connected to human expectations and to the agents' ability to forecast and subsequently intervene in unknown or uncertain situations.

The latest mainstream interpretations define risk as the effect of uncertainties on objectives, although clarifying that the interdependent resulting outcomes may be both negative or positive and therefore including the so-called "upside volatility". This idea relates to the conceivable positive outcome resulting from the effect of an uncertain event.

In this sense, the notion of risk can be interpreted alongside the dual concept of "risk – opportunity".

Further investigating its definition from a financial perspective, it is possible to state that a risk consists in the possibility of achieving a return (outcome) which is inferior to the expected return related to an investment decision. It seems useful to underline that a financial loss, namely the achievement of a negative return (i.e. lower than 0), merely represents a possible case.

In this context, the Financial risk of an investment may be identified as the distribution of the possible deviations (realized returns) from the expected return, and hence from the predefined aim. Intuitively, the Financial risk of an investment reflects the investor's uncertainty relating to the collection of returns as well as the concerns regarding the potential for monetary loss.

Moreover, specifically referring to a Pension Fund framework, a risk may be defined as the contingency of attaining a benefit level lower than the targeted objective or incurring in an underfunding scenario. In this latter event, for instance, the liabilities, represented by the obligations to pay pensions under defined-benefits retirement plans, exceed the assets, namely the investment Portfolio accumulated for the purpose of funding those required payments.

Measuring Risk

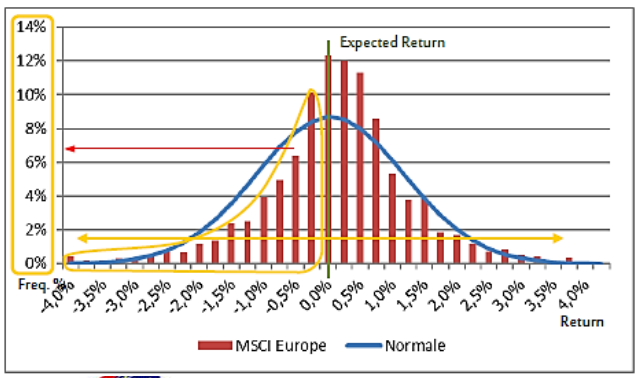
A risk is usually identified by three fundamental elements: a harmful event, the intensity of the event and the probability of the event occurring. With this in mind, an investment is commonly measured on the basis of three main corresponding parameters, that ultimately allow for its graphical representation on a Cartesian coordinate system:

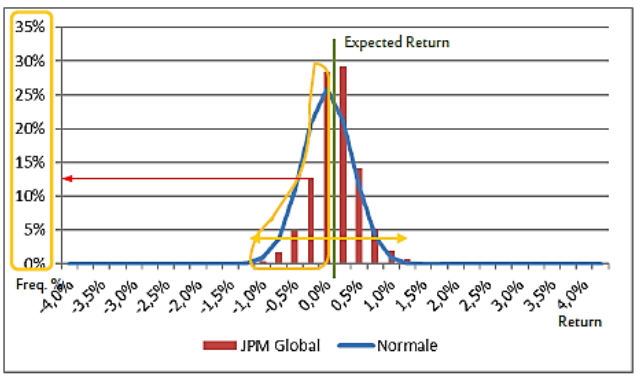
1. The Expected Return
2. The Variability of possible outcomes
3. The Probability of possible outcomes

The Expected Return is a measure of the expected value of a given investment, that is the amount of profit or loss an investor anticipates on a financial investment used to determine whether it will have a positive or negative average net outcome. It is usually based on historical data and, of course, it can as well be analyzed for a Portfolio of investments.

On the other hand, the Variability and the Probability of the possible outcomes represent two fundamental metrics to estimate the magnitude and the frequency with which the actual results deviate from the expected value.

An example of a trading pattern with the related graphical representation of risk measures is reported below.





Risk Components: Systematic Risk and Specific Risk

Having provided a general definition of the Financial risk, it is possible to move on to the description of its two main components: the Systematic Risk and the Specific Risk.

The Systematic Risk, also known as Undiversifiable Risk or Market Risk, is the risk inherent to the entire market. This risk is connected to macroeconomic factors, such as inflation, monetary policies or economic growth, as well as to market functioning factors, such as the Risk Appetite. This type of risk is both unpredictable and impossible to completely avoid because it includes risk factors that are innate within the market and affect the market as a whole.

As a matter of fact, it can only be partially mitigated through diversification and through a correct asset allocation strategy. In order to properly manage Systematic Risk, in fact, investors should include in their investment Portfolios a variety of asset classes such as to ensure, in the event of a major systemic change, an offsetting effect deriving from the different market reactions of each distinctive asset.

As an example of systematic risk, the collapse of Lehman Brothers in 2008 caused major reverberations throughout the financial system and the economy. Lehman Brother's size and integration in the economy caused its collapse to result in a domino effect that reflected a major risk to the financial system in the U.S.

Conversely, the Specific Risk is unique to a single investment. Otherwise known as Unsystematic Risk or Diversifiable Risk, examples of Specific Risks can be traced for instance in the failure of a drug trial, in major oil discoveries, or else in an airplane crash. It is straightforward that all these events will directly affect their respective companies, and possibly industries, but have no effect on assets that are far removed from these industries. Therefore, this peculiar and idiosyncratic risk can be reduced through diversification.

Investors are in fact capable of avoiding Specific Risk by designing a Portfolio of assets that are not highly correlated with one another, meaning that by aggregating uncorrelated holdings to their Portfolios, investors will spread out the business-specific concerns.

Volatility

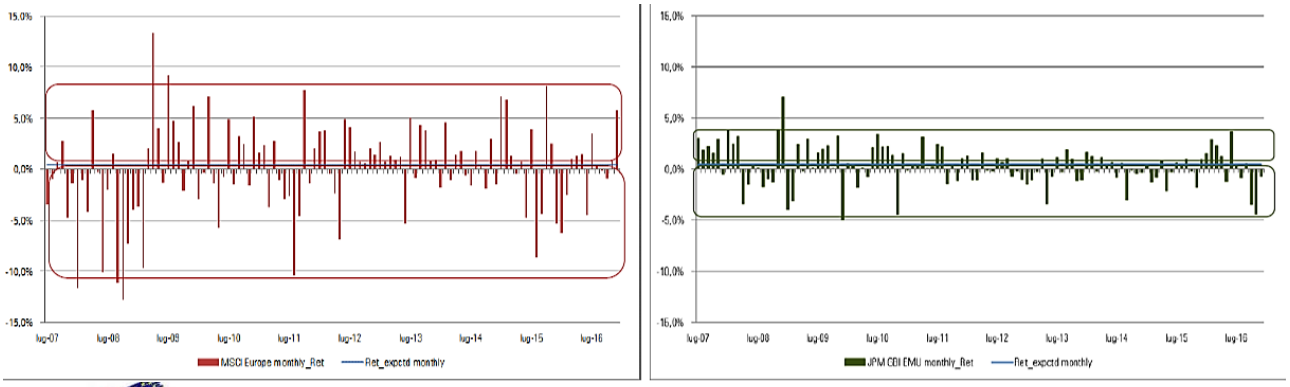
Volatility (σ) is a statistical measure of the dispersion of returns for a given security or market index from the Average Expected Return. It can be measured by using the standard deviation between returns from that same security or market index.

$$\sigma = \sqrt{\frac{\sum (x_i - m)^2}{n-1}}$$

Volatility refers to the amount of uncertainty or risk concerning the size of future changes in a security's value. Commonly, the higher the volatility, the riskier the security. A higher volatility entails that a security's value can potentially be spread out over a larger range of values. This means that the price of the security can change dramatically over a short time period in either direction. Conversely, a lower volatility implies that a security's value does not fluctuate dramatically, but changes in value at a steady pace over a period of time.

An additional interesting measure of risk is represented by a security's Beta (β), which captures the relative volatility of a particular security to the market. Beta approximates the overall volatility of a security's returns against the returns of a relevant benchmark (usually the S&P 500) and represents a measure of the volatility, or systematic risk, of a security or a Portfolio in comparison to the market as a whole.

In the following chart, on the left, it is possible to observe that the European Stock Market Index (MSCI Europe TR) has registered, during the last ten years, a monthly volatility equal to 4,5%, while recording an average monthly return of 0,4% (ranging from 4,9% and -4,1% in 65% of the observations).



On the right instead, it is clear that, across the same time horizon, the European Government Bond Index (JPM GBI EMU) has reported a monthly volatility of 1,9% with an average monthly return equal to 0,3% (observing returns ranging from 2,2% and -1,6% in 65% of the cases).

This comparison makes it possible to highlight how different types of securities denote different risk-return profiles.

Classification

The Financial Risk so far described may be defined as a wide concept that encompasses many different types of risks related to the finance industry. A classification of the most significant ones is provided below.

Market Risk: consists in the possibility for investors to experience losses due to factors that affect the overall performance of the financial markets in which they are involved. Market Risk is the risk of losses arising from negative price variations of Portfolio's securities that are due to exogenous market conditions.

Interest Rate Risk: it is the risk related to the changes in returns and values of an investment caused by movements in interest rates. Interest Rate Risk affects the value of bonds more directly than stocks, and it is a major risk to all bondholders. As interest rates rise, bond prices fall, and vice versa. The rationale is that as interest rates increase, the opportunity cost of holding a bond decreases since investors are able to realize greater yields by switching to other investments that reflect the higher interest rate.

Credit Risk: it refers to the risk that a borrower may not repay a loan and that the lender may lose the principal of the loan or the interest associated with it. Credit Risk consists in the possible price loss a bondholder could incur as a result of the issuer's inability to fulfill the obligations to investors.

Currency Risk: commonly referred to as exchange rate risk, it arises from the change in the price of one currency in relation to another. Investors or companies that have assets or business operations across national borders are exposed to currency risk that may create unpredictable profits and losses.

Liquidity Risk: it describes the risk stemming from the lack of marketability of an investment that cannot be bought or sold quickly enough to prevent or minimize a loss. With Liquidity Risk, typically reflected in unusually wide bid-ask spreads or large price movements, the rule of thumb is that the smaller the size of the security or its issuer, the larger

the risk. The main consequence deriving from facing Liquidity Risk concerns being forced to borrow at excessive cost to cover immediate needs.

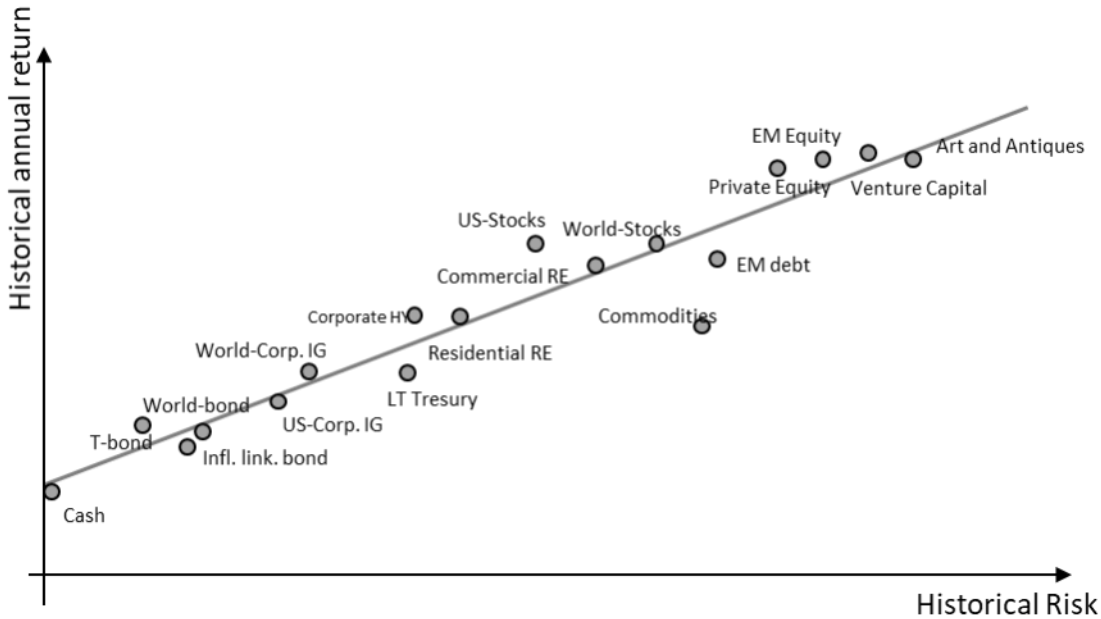
Counterparty Risk: consists in the risk to each party of a contract to incur losses deriving from the counterparty not living up to its contractual obligations. Counterparty Risk is a risk to both parties and should be considered when evaluating a contract. Furthermore, in most financial contracts, Counterparty Risk is also known as default risk.

Operational Risk: it describes the risks a company undertakes when it attempts to operate within a given field or industry. Operational Risk is not inherent to systematic or market-wide risk, but instead, it includes risks associated with active decisions relating to how the organization operates and what it prioritizes. A loss associated with Operational Risk may, for instance, arise from breakdowns in internal procedures, from business operations failing due to human error or from a technological collapse. Operational risk relates to human risk and, intuitively, industries with lower human interaction are likely to have a lower operational risk.

Risk Premium

Investors provide time-accessible capital and engage in risk-taking activities on the Financial Markets. Therefore, they expect to be properly compensated and rewarded through returns for the amount of risk they undertake.

Specifically, investors are willing to risk losing their money because of the uncertainty of a potential investment failure in exchange for receiving extra returns as a reward if the investment turns out to be profitable.



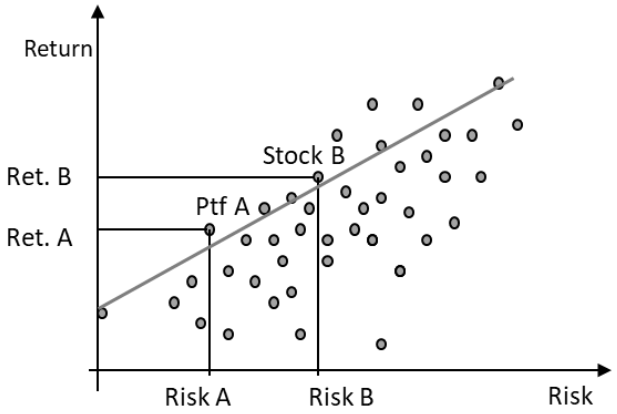
The time-accessibility of capital provided by investors, the so-called "Price of Time", is rewarded by the Risk-Free Rate, corresponding to the return of a riskless investment of an equal lifetime. This "Normal" or Risk-Free Rate of interest (such as on fixed deposits at banks) corresponds to the remuneration that an investor requires as an inducement to invest.

The riskiness of each particular investment instead, defined as "Price of Risk", is rewarded by the Risk Premium, namely the difference between the total return from a risky investment (such as equity stock) and a Risk Free return (such as from government bonds) an investor requires for investing as a compensation for the risk profile of the investment.

In other words, a Risk Premium is the return in excess of the Risk-Free Rate of return an investment is expected to yield, and it describes a form of compensation for investors who tolerate the extra risk, compared to that of a riskless asset, in a given investment.

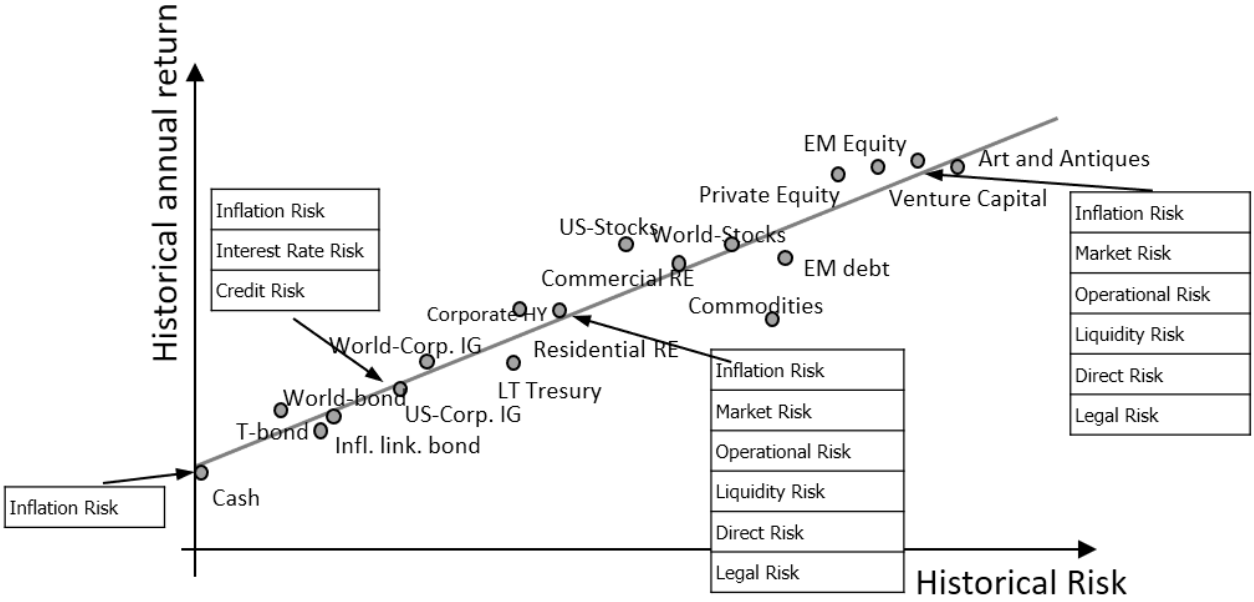
Having this in mind, it is straightforward to understand that there exists a linear positive relationship between risks and returns. The higher the return, the riskier the investment, and vice versa.

Each investment, or Portfolio of investments, has its distinctive risk-return characteristics. These are used to identify the investment and to graphically represent it on a Risk / Return coordinate system.



Taking into account the chart above, it is easy to acknowledge that the Portfolio A has a return equal to Ret. A and a riskiness of Risk A.

Having highlighted that every investment is identified by its risk and return configuration, it is possible to assert that, in a forward-looking perspective, every investment is defined by its Expected risk and its Expected return, namely the two key characteristics to take into account when facing an investment decision. Of course, it is always useful to remember that different investments show different types of Financial Risks, as it may be observed in the following graph.



Moreover, it is important to underline that every Financial Risk has to (or at least should) be remunerated by a Risk Premium. Indeed, an investor would not be willing to tolerate an uncompensated extra risk. This is due to the Risk Aversion of investors, meaning that, when faced with two investments with a similar expected return, rational investors prefer the one with the lower risk.

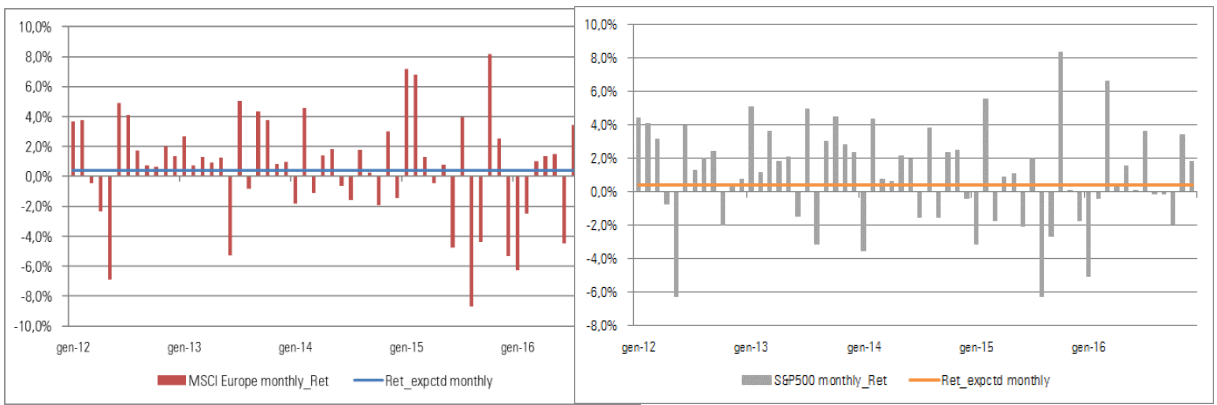
Portfolio

Return

The Portfolio return is the monetary return experienced by the holder of a Portfolio. Portfolio returns can be calculated on a daily or long-term basis to serve as a method of assessing a particular investment strategy. The overall return must be compared to the required benchmarks and risks.

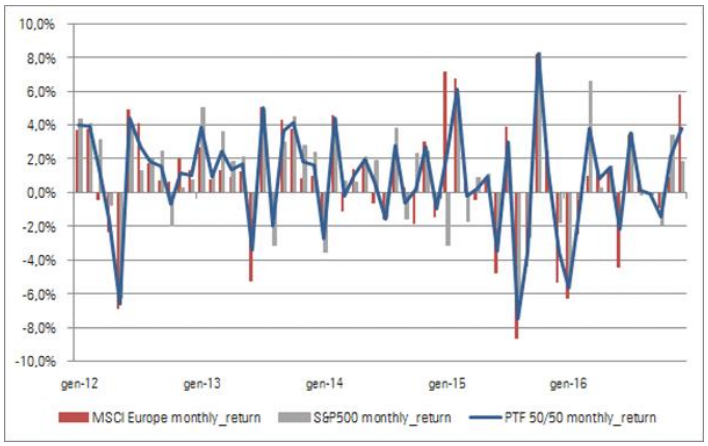
When taking into consideration, for instance, a two-asset Portfolio PTF equally invested in the two assets A and B, meaning that the proportions of the investment are both equal to 50% of the initial budget, what will the return of Portfolio PTF be?

Suppose asset A yields an Average Return equal to 0,67% and a Volatility of 3,47%, while asset B shows an Average Return of 1,01% and a Volatility equal to 2,99% (as shown in the



charts below).

The Average Return of Portfolio PTF will be equal to the weighted average of the returns of the individual assets, weighted by the proportions of the investment in each individual asset.



Assuming w_i to be the weight assigned to the i-th investment, and μ_i the average return of the i-th investment, the Average Return of the Portfolio can be expressed by the formula:

$$Ret_{Ptf} = \sum_i^n w_i * \mu_i$$

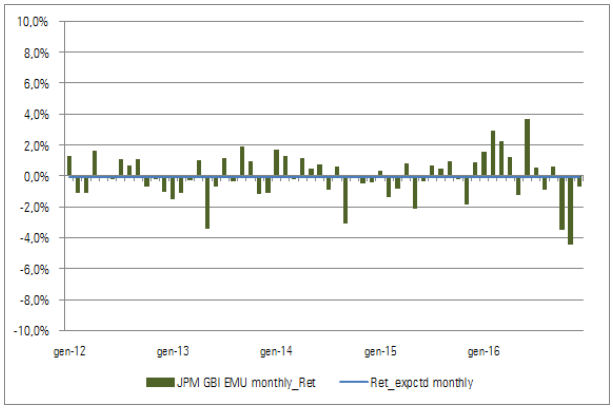
The Average Return of Portfolio PTF will hence be equal to (50% * 0,67%) + (50% * 1,01%) = 0,84%

Risk

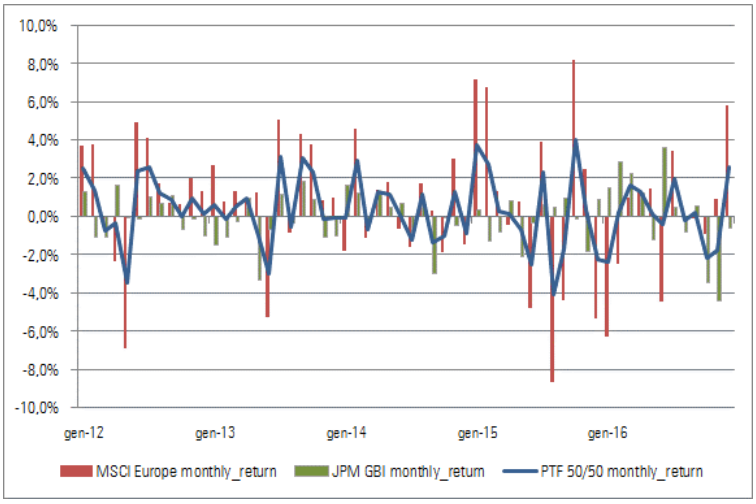
When it comes to the definition of a Portfolio's riskiness, it is necessary to take into consideration the Volatility of the Portfolio. Portfolio Volatility is a measurement of how the aggregate actual returns of a set of securities making up the Portfolio fluctuate over time. This Portfolio Volatility statistic is calculated using the standard deviations of each security in the Portfolio as well as the correlations of each security pair in the Portfolio. This last concept requires a further investigation.

Given the volatilities of the two individual assets A and B from the previous example, respectively 3,47% and 3,03%, one would assume that the overall volatility for the Portfolio would be estimated by the weighted average of the volatilities of these two assets, resulting in a Portfolio Volatility equal to 3,23%. However, this is not the case. The Volatility of Portfolio PTF (A, B) turns out to be equal to 2,98%, but how come the riskiness of the Portfolio is lower than the weighted average riskiness of the two individual securities?

This configuration in common to any kind of Portfolio. Assume for example the equally invested Portfolio PTF (A, C), composed by the aforedescribed asset A and a new asset C which yields an Average Return equal to -0,05% and a Volatility of 1,48%, and whose graphical representation is provided below.



It is possible to notice that the weighted average of the two volatilities would be equal to 2,47%, while the actual Volatility of Portfolio PFT (A, C), represented below, is equal to 1,80%.



The reason behind this difference lies in the fact that, indeed the riskiness of a Portfolio depends on the level of risk of the individual assets by which it is composed, but most importantly it is subject to how these assets interact among themselves. The degree to which two securities “move” in relation to each other is measured by the Correlation Coefficient.

Statistically, the Correlation is a measure of the intensity and direction to which two variables (in this case two returns) tend to move together, meaning how they are related to one another. Generally, a lower correlation between securities in a Portfolio results in a lower Portfolio riskiness. The Correlation Coefficient can assume values ranging from -1, denoting an Inverse Correlation, to a maximum of 1 corresponding to a Direct Correlation.

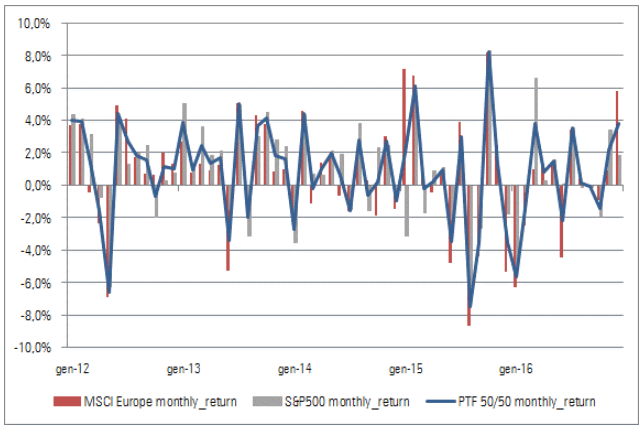
In this perspective, the Correlation between the returns of the two assets significantly affects the riskiness of the Portfolio.

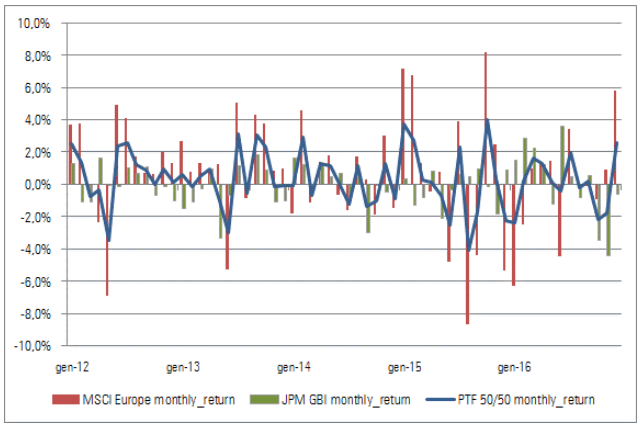
Modern Portfolio theories state that Portfolio Volatility can be reduced by properly choosing asset classes. In fact, the riskiness of the Portfolio in the event of a negative variation of a security is mitigated or smoothed by the opposite reaction of the other security, which for instance will present a positive variation if negatively correlated to the other. Therein lies the explanation of why the overall Portfolio Volatility is lower than the weighted average of the individual assets' volatilities.

Portfolio Volatility is calculated by multiplying the squared weight of each security by its corresponding volatility and adding twice the weighted average weight multiplied by the covariance of all individual security pairs, as described in the formula below.

$$Vol_{Ptf} = \sqrt{\sigma^2_{Ptf}} \qquad \sigma^2_{Ptf} = \sum_{i=0}^{n} w_i^2 \sigma_i^2 + 2 \sum_{i,j}^{n} w_i \, w_j \rho_{ij} \sigma_i \sigma_j$$

The concept describing the dependence of the Volatility of a Portfolio on both the individual volatility of the investments and on the Correlation (ρ_{ij}) between them is fundamental.





Furthermore, understanding that a lower Correlation corresponds to a lower Portfolio Volatility introduces the analysis of another central concept: Diversification.

Diversification

Diversification is a Risk Management technique that combines a broad variety of investments within a Portfolio. The rationale behind this technique claims that a Portfolio constructed of different kinds of investments will, on average, yield higher returns and pose a lower risk than any individual investment found within the Portfolio.

Diversification aims at reducing unsystematic risk events in a Portfolio so that the positive performance of some investments neutralizes the negative performance of others. Therefore, the benefits of diversification hold only if the securities in the Portfolio are not perfectly correlated.

As stated before, the Volatility of a Portfolio depends on the Volatility and weights of each of the individual investments that make up the Portfolio itself, and on the Correlation between the investments. Intuitively, the lower the Correlation is, the lower the Volatility of the Portfolio will be.

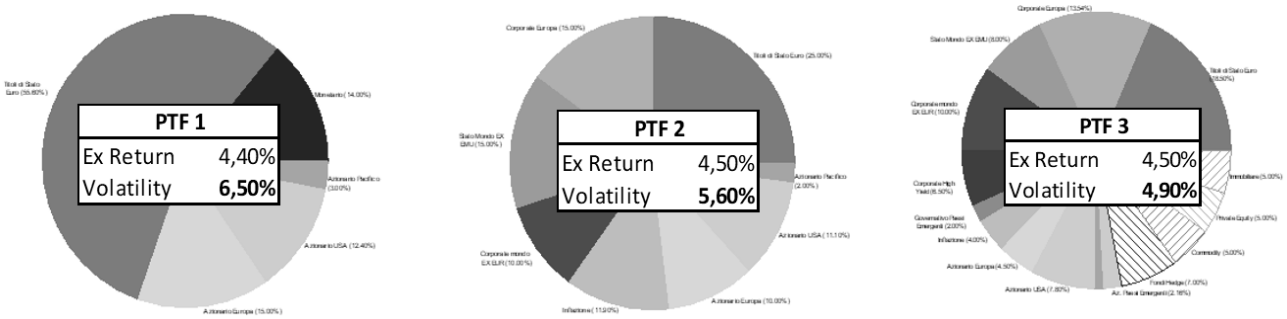
As a matter of fact, the Correlation determines the riskiness of a Portfolio and, therefore, the more the investments in the Portfolio are diversified, the lower the Volatility of the entire Portfolio will be. That is also an explanation of why it is possible to identify the Correlation as a measure of Diversification.

In the chart below, the Correlation Matrix represented provides a useful insight on the degree of Diversification within a possible Portfolio.

Correlation Matrix (5yr) - *2014*						
	Govt Euro	Corp Euro	Govt World	Equity Europe	Equity USA	Hedge
Govt Euro	1,00					
Corp Euro	0,80	1,00				
Govt World	0,74	0,67	1,00			
Equity Europe	-0,13	0,24	0,56	1,00		
Equity USA	-0,17	-0,03	0,57	0,68	1,00	
Hedge	0,31	0,07	0,35	0,63	0,56	1,00

Furthermore, it is important to underline that the Volatility of a Portfolio is also related to the number of securities the Portfolio is invested. In fact, a lower level of risk will result from a Portfolio composed of a multitude of (diversified) securities.

The number of invested securities will impact both on the business-specific Risk of the Portfolio, as well as on the Systematic Risk, mitigated by the variety of markets and industries represented within the Portfolio. The effects of a larger number of investments on the Volatility of a Portfolio can be inferred from the chart below.



To sum up these concepts regarding Portfolio's risks and diversification, it is useful to highlight once again that the Volatility of a Portfolio is significantly related to the Correlation between the investment within contained, and that it could be mitigated through a proper Diversification strategy.

Diversification is the spreading of risk and reward within an asset class. Because it is difficult to know which particular subset of an asset class or sector is likely to outperform another, diversification seeks to capture the returns of all of the sectors over time but with less volatility at any one time. Proper diversification takes place across different classes of securities, sectors of the economy and geographical regions.

Indeed, the Diversification allows for a risk reduction when the investments selected present a negative or low correlation between themselves, and it is, therefore, true that pursuing a diversified construction of the Portfolio implies a significant reduction of its Volatility.

As opposed to other Risk Management strategies, Diversification does not involve a reduction in the investment returns, but instead, it allows for a higher profitability for the same level of risk. As a matter of fact, the Diversification strategy is developed by:

- Properly selecting uncorrelated investments or securities
- Broadening the investment universe, by amplifying investment classes and markets involved
- Increasing the number of investments in the Portfolio

Finally, it is important to highlight that the Diversification activity has to be developed through a formal and systematic process, whose results have to be measurable and verifiable reliably.

Portfolio Management

Finance is defined as the discipline that analyses the processes through which agents (institutions, firms, people, etc.) manage monetary flows over time. Finance examines the money allocation methodologies among multiple competing alternatives in order to maximize the investor's utility.

The concept of utility describes the total satisfaction of the investor, attained through the accomplishment of the objectives. As a general rule, the investor's objective corresponds to receiving a certain return (expected return) in a given time horizon, consistent with the investor's level of Risk Aversion or Risk Propensity.

The Financial Markets are those marketplaces in which investors exchange risks in the face of potential earnings, namely the returns. These returns represent the compensation investors receive for the risks to which they are exposed. Expected risks and Expected returns are two related dimensions, and they are reflected in the Prices of the financial instruments.

Financial Management refers to the specific planning of the usage and management of financial resources to attain objectives as a business concern and return maximum value to shareholders. Strategic Financial Management involves precisely defining business objectives, identifying and quantifying resources, devising a plan for utilizing finances and other resources to achieve goals, and establishing procedures for collecting and analyzing data, making financial decisions, and tracking and analyzing volatility between budgeted and actual results to identify problems and take appropriate corrective actions.

The essential purpose of Financial Management consists in the allocation of the "risk budget" in the most efficient way possible and in compliance with the return maximization objective. Moreover, it is possible to state that an institutional investor is a risk manager, whose returns reflect its risk budget spending decisions among different risk premiums.

Investors are risk averse, utility-maximizing, rational individuals. Risk Aversion means that investors expect to be compensated for accepting the risks. Note that the assumption does not require investors to have the same degree of risk aversion, but it only requires that they are averse to risk.

Utility maximization implies that investors want higher returns and that investors always want more wealth (i.e., investors are never satisfied). Investors are understood to be rational in that they correctly evaluate and analyze available information to arrive at rational decisions.

Although rational investors may use the same information to arrive at different estimates of expected risk and expected returns, homogeneity among investors requires investors to be rational individuals.

Risk aversion and utility maximization are generally accepted as reflecting a realistic view of the world. Yet, rationality among investors has been questioned because investors may allow their personal biases and experiences to disrupt their decision making, resulting in sub-optimal investments.

Efficient Portfolios

In order to build up an Investment Portfolio, an investor will have to carry out several activities, such as making decisions about investment mix and policy, matching investments to objectives, allocating assets and balancing risk against performance. All these actions constitute the Portfolio Management.

In the definition of the Portfolio Management strategy, investors will have to perform two fundamental activities:

1. Identify an investible universe (feasible set) suited for the return objectives and capable of maximizing the diversification of risks.

2. Define a composition and an allocation of the Portfolio able to minimize the riskiness for a given level of expected profitability, or otherwise suited for the profitability maximization for a given level of volatility (Risk Aversion), through the maximization of the diversification of Portfolio risks.

Assume for instance that investors find themselves in front of a scenario in which they have to choose among different Portfolios. Indeed, they will make their Portfolio decisions based on the two aforedescribed parameters of Profitability and Volatility.

Recall that the Profitability of the Portfolio, expressed by the Expected Return, is defined as:

$$Ret_{ptf} = \sum_i^n w_i * \mu_i$$

As previously mentioned, it depends on:

- The profitability of the investments (asset classes, markets, securities, etc.) and of the invested Portfolios, according to the limits and constraints imposed by the investor
- The allocation and the composition of the Portfolio

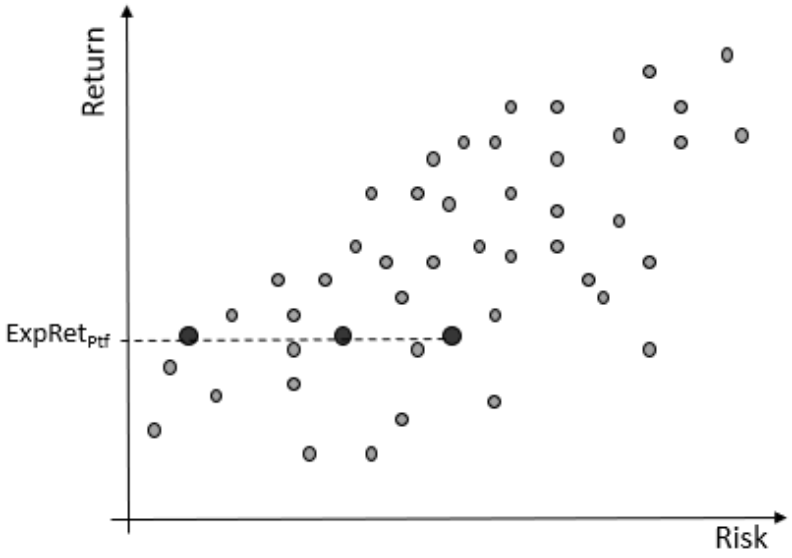
On the other hand, the Volatility of the Portfolio is described by the formula:

$$Vol_{Ptf} = \sqrt{\sigma^2_{Ptf}} \qquad \sigma^2_{Ptf} = \sum_{i=0}^{n} w_i^2 \sigma_i^2 + 2 \sum_{i,j}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j$$

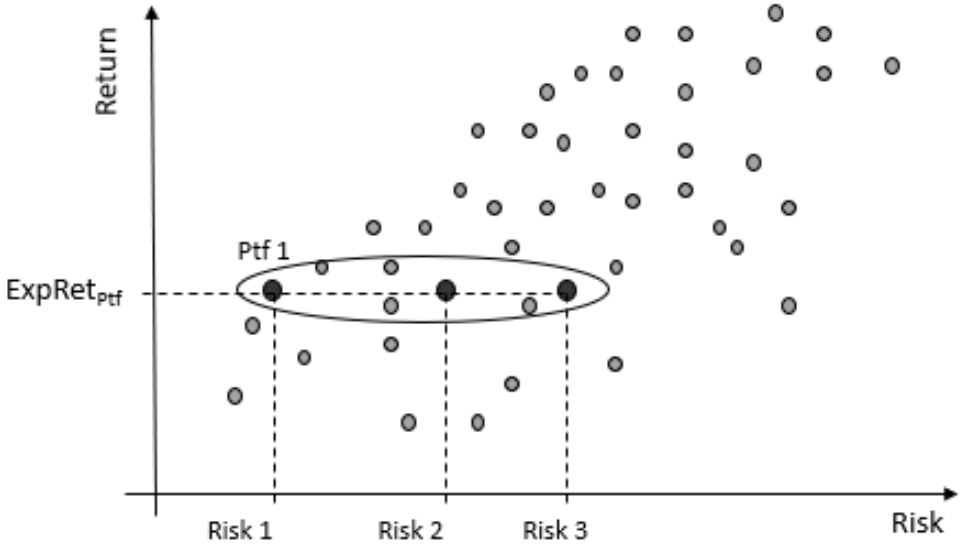
The Volatility of the Portfolio depends upon:

- The riskiness of the investments (asset classes, markets, securities, etc.) and of the invested Portfolios, according to the limits and constraints imposed by the investor
- The allocation and the composition of the Portfolio
- The Correlation between investments

Having this in mind, is it possible to establish whether the three Portfolios represented in the graph below are equal? And if that will be equal for an investor to hold any of these Portfolios, since they all yield the same Expected Return?



Of course, these three Portfolios are not equal. In fact, each Portfolio has its own individual level of riskiness, and consequently a different level of efficiency.



As a matter of fact, for a given return equal to the one presented in the chart, according to the theory of investors' Risk Aversion, every investor will decide to hold PTF 1, which represents the less risky Portfolio among the possible alternatives yielding to the same expected return, and which therefore represents the most efficient Portfolio.

An Efficient Portfolio is defined as the less risky Portfolio for a given level of Expected Return, or equivalently, the Portfolio yielding the highest Expected Return for a given level of risk (according to the CAPM Theory). In the previous example, the Portfolio PTF1 is the less risky one among the three Portfolios yielding to the same return of $ExpRet_{PTF}$, and therefore, it can be identified as the Efficient Portfolio.

Understanding the rationale behind Efficient Portfolios, and thus behind investors' interest in identifying and selecting only the Efficient Portfolios is quite straightforward.

First of all, rational investors, according to their Risk Aversion, are willing to tolerate the lowest possible level of risk in order to get to a given level of return. If instead investors were willing to tolerate a higher level of risk, thus, for instance, investing in a portfolio with a risk equal to Risk 3, they would require an Expected Return such that their selected Portfolio coincides with an Efficient one.

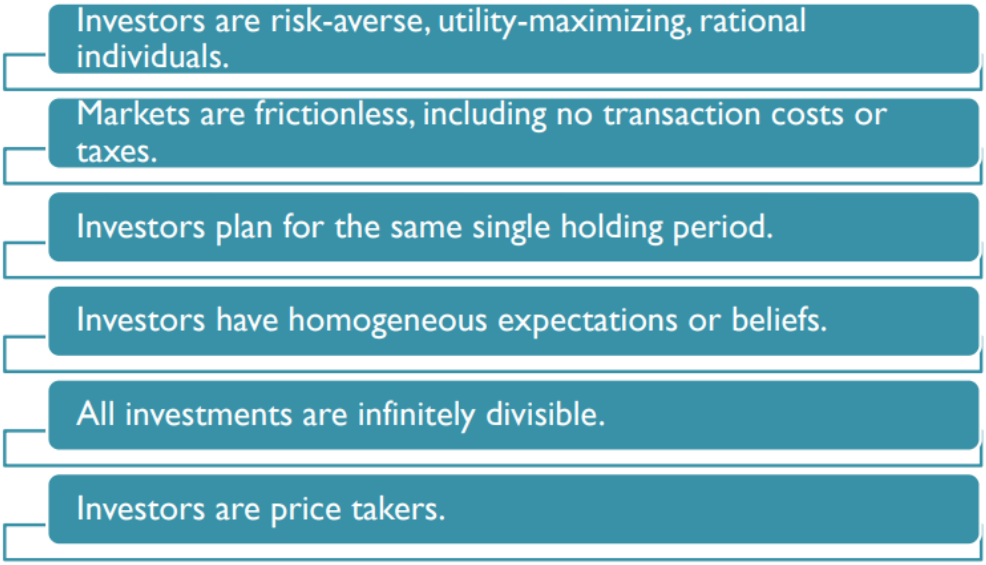
It is useful to recall that Risk can be seen as a price for the return of a security, and hence, the higher the expected return investors desire, the more risk they will have to tolerate. Selecting a Portfolio which is not efficient means that investors are tolerating an excess risk compared to the level of return they will get, that is "squandering" (misallocating) the risk budget.

Capital Asset Pricing Model

The concept of Efficient Portfolio is expressed in the notorious Capital Asset Pricing Model Theory. This theory is not a subject of this presentation, yet it seems useful to provide a brief

overview of its characteristics, in consideration of the implications it has had on the Modern Portfolio theory.

The main assumptions of the CAPM are presented in the chart below.



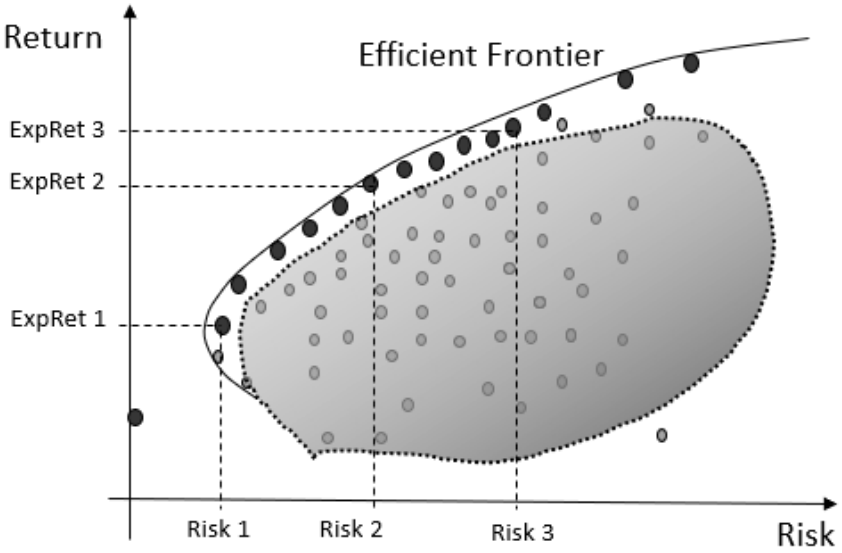
The outcome of this fundamental theory can be traced in two major implications that affect every current Portfolio Management strategy.

1. Capital Market Line: regarding Individual Optimization, the CML defines the individual optimal Portfolios for investors interested in the return and risk measures of their optimal Portfolio

2. Security Market Line: regarding General Equilibrium, the SML defines the Risk-Return relation for each individual asset, given agreement between investors on the statistical properties of asset returns and on the importance of Optimization

Efficient Frontier

The Efficient Frontier is the set of optimal portfolios that offers the highest expected return for a defined level of risk, or the lowest risk for a given level of expected return. Portfolios that lie below the efficient frontier are sub-optimal because they do not provide enough return for the corresponding level of risk. Portfolios that cluster to the right of the efficient frontier are also sub-optimal because they have a higher level of risk for the defined rate of return.



Since the Efficient Frontier is curved, rather than linear, a key finding of the concept is the benefit of diversification. Optimal portfolios that comprise the Efficient Frontier tend to have a higher degree of diversification than the sub-optimal ones, which are typically less diversified. The Efficient Frontier concept was introduced by Nobel Laureate Harry Markowitz in 1952 and is a cornerstone of Modern Portfolio Theory.

By definition, when a Portfolio lies on the Efficient Frontier, it is not possible to get that same return with a lower level of risk, hence that risk is not diversifiable further. Notice in fact that for each given level of return, the Frontier conveys the Portfolio yielding the lower level of risk among the possible Portfolios. The possible Portfolios are those which satisfy the constraints, and therefore it is possible to state that the constraints, along with the expected risk-return objectives, define and affect the position of the Efficient Frontier, which, as a matter of fact, moves in accordance to the changes in these elements.

Based on the configuration of the Efficient Frontier, the activity of investors consists in selecting:

- Among the Investible Portfolios,
- The Efficient one,
- On the basis of the Return Objectives and in compliance with the Risk Aversion/Propensity

It is straightforward that considering sub-optimal (non-efficient) Portfolios makes no sense in the selection of the investors' Portfolios.

Objective Definition

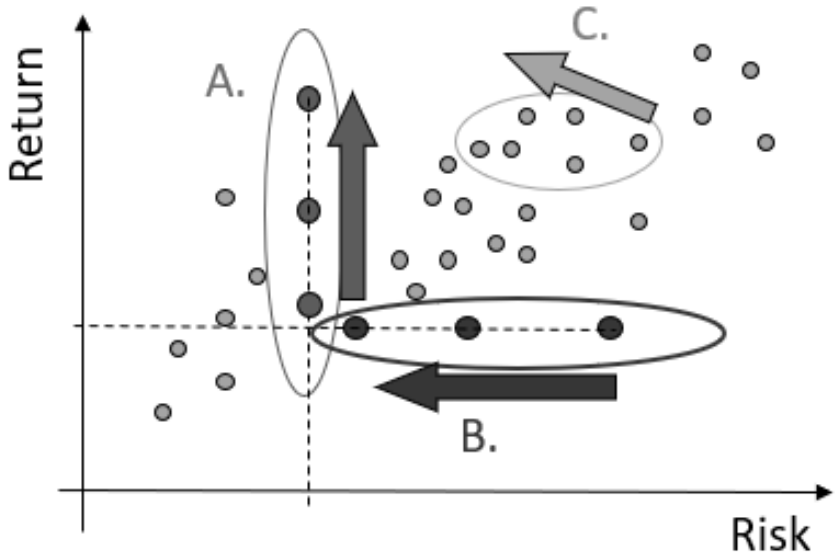
An investor has to identify and formalize the Objectives relating to Risk, Return and Time Horizon of the budget management activities. Investors have, and must have an objective, otherwise, they cannot be defined as Investors.

Taking into consideration the natural Risk Aversion of investors, the Objectives may be either:

1. The achievement of the maximum return for a given level of risk, within a certain time horizon.

2. The achievement of a defined level of profitability (return), within a certain time horizon, with the lowest risk possible.

While performing the definition of their Objectives, it is useless for investors to consider Risk and Return separately, as it is useless for them to prioritize one element over the other, since these two features must be considered alongside one another.



The scenario represented in the chart above makes it possible to take into consideration three different circumstances:

A. Given the same level of risk, the asset represented at the top of the graph is evidently the optimal solution for investors, since it provides the highest return for the defined level of risk.

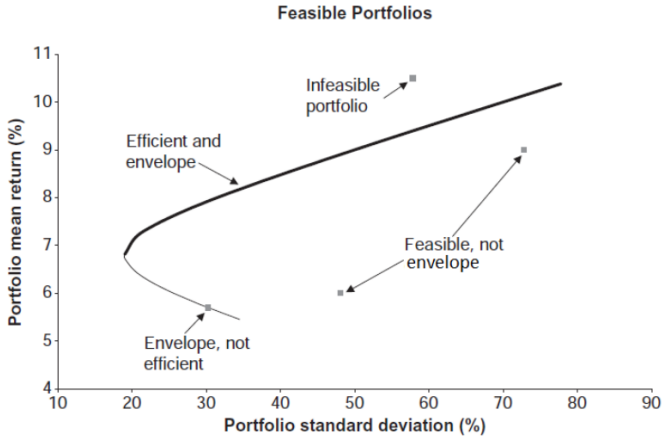
B. Given the same level of return, the optimal solution is identified by the leftmost asset, yielding to the defined level of return with the lowest possible level of risk.

C. This scenario highlights that investors usually tend to be interested in those assets that are represented on the top - left section of the graph, since, according to their risk-return profiles, these assets represent the most efficient alternatives.

Investible Universe: Limits and Constraints

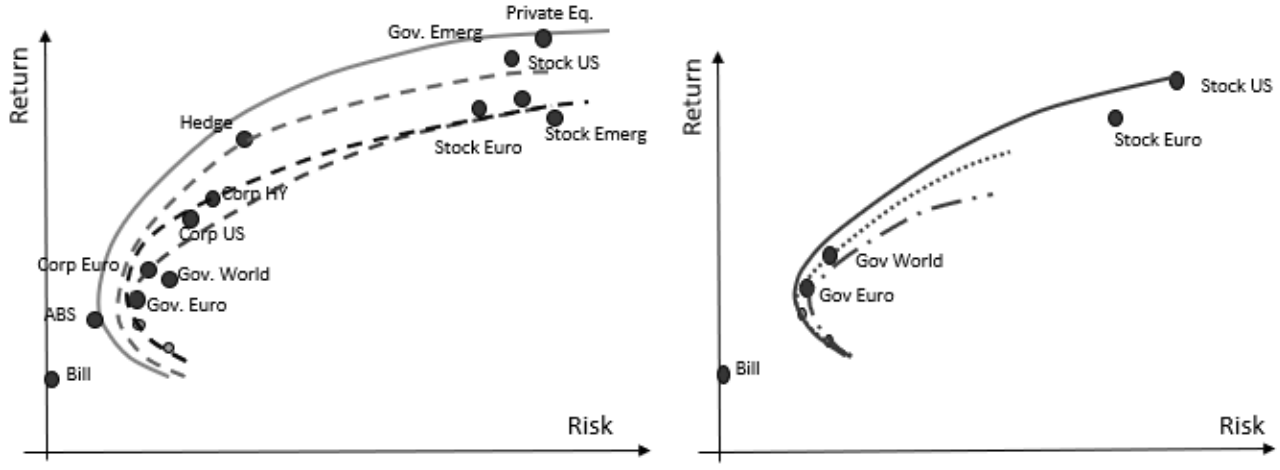
Assume a risk-seeking investor uses the Efficient Frontier to select investments. The investor would select securities that lie on the right end of the Efficient Frontier. The right end of the

Efficient Frontier includes securities that are expected to have a high degree of risk coupled with high potential returns, which is suitable for highly risk-tolerant investors. Conversely, securities that lie on the left end of the Efficient Frontier would be suitable for risk-averse investors.



According to their preferences and propensity towards risk, investors will develop their investment selection among the Feasible Portfolios, the possible set of investments from the available alternatives falling within the limits of investor's capital resources, risk tolerance, and objectives.

The Investible Universe (Envelope) comprises all the possible investment Portfolios which can be constructed from the available universe of individual investments.



The Efficient Frontier represents the set of Efficient Portfolios of the Investible Universe, for each given level of return (or risk). The investible markets, the limits and the constraints define the Investible Universe and, therefore, the Efficient Frontier. It is straightforward that adding investment assets enhances the degree of diversification and, therefore, the efficiency of the Portfolio, while increasing the set of constraints to which the Portfolio Management strategy is subject may reduce the degree of diversification of the Portfolio.

When developing the Portfolio of investments, it is important to consider an investor's constraints. There are five major types of constraints that need to be primarily considered.

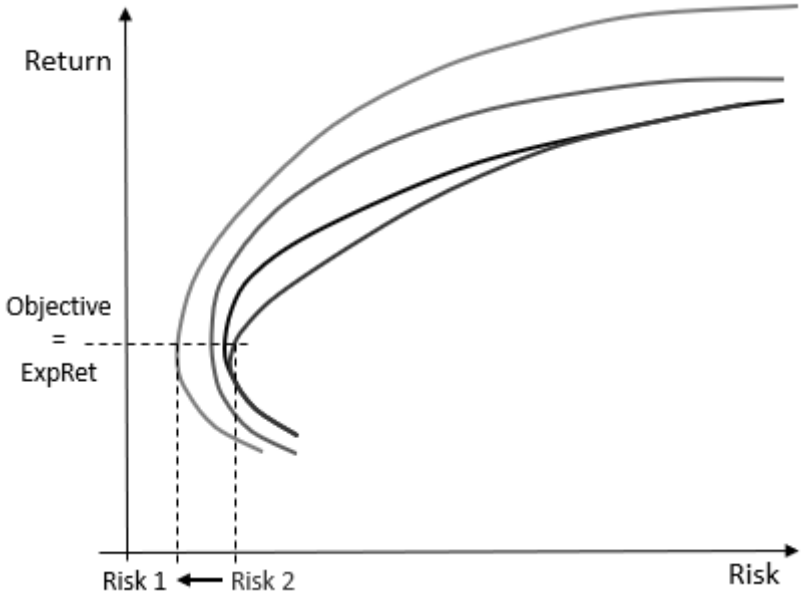
Liquidity Constraints: Liquidity constraints identify an investor's need for liquidity or cash. Such constraints are associated with cash outflows expected and required at a specific time in future and are generally in excess of income available. It Is important to keep liquidity constraints in mind while considering an asset's ability to be converted into cash without impacting the Portfolio value.

Time Horizon: This constraint develops a timeline of an investor's various financial needs. The time horizon also affects an investor's ability to accept risks. If an investor has a long time horizon, the investor may have a greater ability to accept risk thanks to a longer time period to recoup any losses. This is unlike an investor with a shorter time horizon whose ability to accept risk may be lower because he would not have the ability to recoup any losses. Therefore, such constraints are important to determine the proportion of investments in long-term and short-term asset classes.

Tax Concerns: These constraints depend on when, how and if returns of different types are taxed. Investors focus on After-tax returns when creating a Portfolio. If an investor is currently in a high tax bracket as a result of his income, it may be important to focus on investments that would not make the investor's situation worse, like investing more heavily in tax-deferred investments.

Legal and Regulatory: Legal and regulatory factors can act as an investment constraint and must be considered. Such constraints are mostly externally generated and may affect institutional investors.

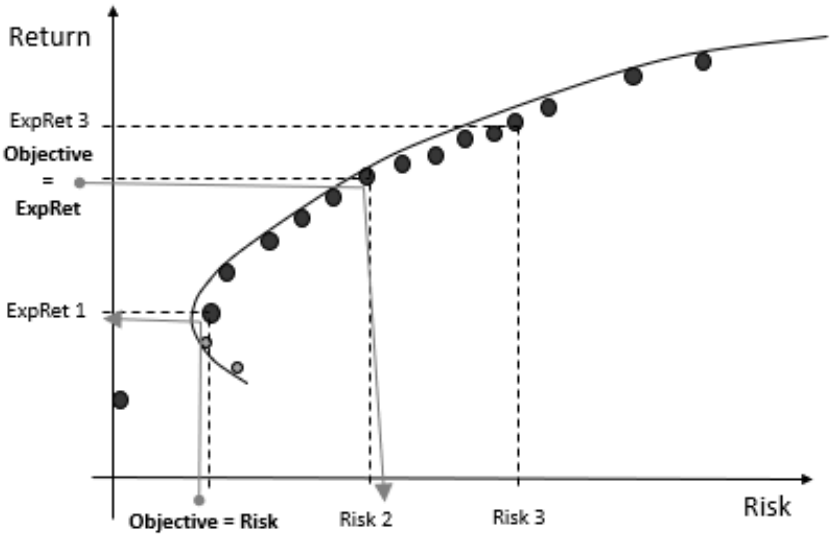
Unique Circumstances: Such constraints are mostly internally generated and signify investor's special concerns. An example of a unique circumstance would be the constraint an investor might place on investing in any company that is not socially responsible, such as a tobacco company.



Different Investible Universes and Constraints determine investment Portfolios with different Efficiency levels. Furthermore, apparently riskier Investible Universes can instead prove to be far more efficient, allowing for the achievement of the return Objectives through less risky Portfolios.

Allocation

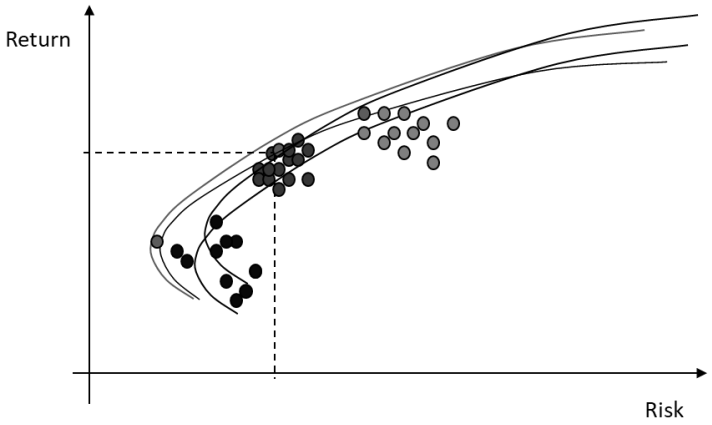
Establishing a return Objective involves identifying a risk Objective and vice versa, as there is only one Efficient Portfolio for each level of return (or risk).



The assumptions and estimates adopted in the construction of the Efficient Frontier must be assessed in their unpredictability by means of historical simulations or systematic variations, arbitrary and progressive to the input data of the model, and observing the changes in the

values of risk, return and efficiency of the Portfolio. This activity is called Stress Testing or Scenario Analysis.

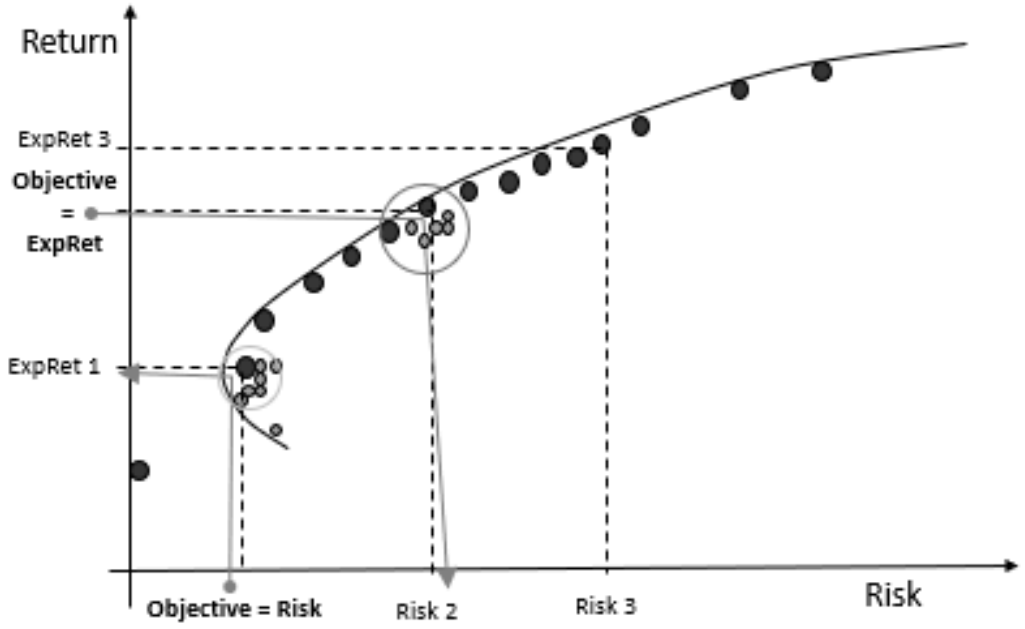
The Stress Testing is defined as a simulation technique used on asset and liability Portfolios to determine their reactions to different financial situations. Additionally, stress tests are used to gauge how certain stresses will affect a company, industry or specific Portfolio. Stress tests are usually computer-generated simulation models that test hypothetical scenarios and represent a useful method for determining how a Portfolio will fare during a period of financial crisis.



As market conditions change, Stress Testing allows for the mapping of the Efficient Frontier's movements, as well as of the variations in the possible target allocations on the risk/return plan, in order to evaluate the changes in the risk-return profile and efficiency of the Asset Allocation.

Asset Allocation is an investment strategy that aims to balance risk and reward by apportioning a Portfolio's assets according to an individual's goals, risk tolerance, and investment horizon. The three main asset classes - equities, fixed-income, and cash and equivalents - have different levels of risk and return, so each will behave differently over time.

Setting as Objective a targeted return (or risk) makes it possible to identify a feasible set of investible (feasible) Portfolios close to the Efficient Frontier which provides the best resilience characteristics resulting from the Stress Tests.



As a matter of fact, an investor identifies the optimal allocation (Strategic Asset Allocation) by taking into consideration, among the possible alternatives close to the Efficient Frontier with the targeted objective features, three fundamental characteristics :

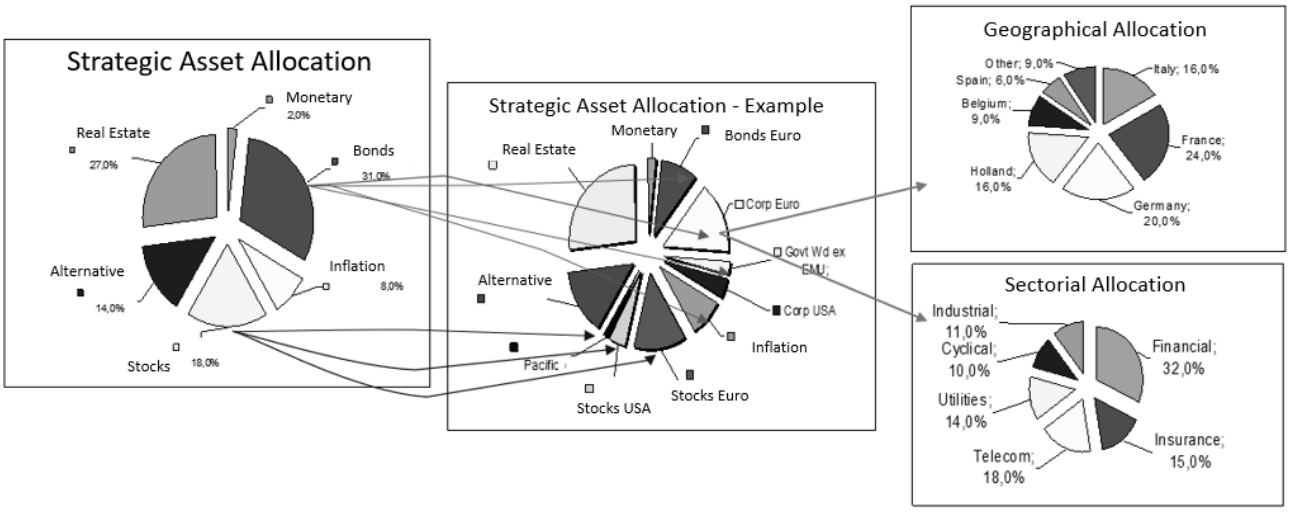
3. Liquidity
4. Replicability
5. Investibility

Strategic Asset Allocation involves setting target allocations for various asset classes and rebalancing periodically. The Portfolio is rebalanced to the original allocations when they deviate significantly from the initial settings due to differing returns from the various assets.

This Portfolio strategy is based on Modern Portfolio Theory, which emphasizes diversification to reduce risk and improve Portfolio returns. As previously described, any Portfolio strategy depends on several factors, such as the investor's risk tolerance, time horizon, and investment objectives, and it is easy to understand that changes in these features may affect the Strategic Asset Allocation strategy itself.

Composition

The Allocation among investment classes is only the first phase of Portfolio construction/diversification. Each investment class is itself diversified into sub-classes and later into markets, currencies, etc.



The diversification process must be as thorough as possible. Each investment is assessed for the impact on the overall Portfolio, and each class and sub-class of investment must achieve a diversification degree equivalent to the market.

The composition of investments in a Portfolio depends on a number of factors, including investor's risk tolerance, investment horizon and amount invested. Portfolio investments for the largest institutional investors such as Pension Funds and Sovereign Funds include a significant proportion of infrastructure assets like bridges and toll roads. Portfolio investments for institutional investors generally need to have very long lives so that the duration of their assets and liabilities match.

Portfolio investments can span a wide range of asset classes such as stocks, government bonds, corporate bonds, Treasury bills, real estate investment trusts, exchange-traded funds, mutual funds and certificates of deposit. Portfolio investments can also include options, derivatives such as warrants and futures, and physical investments such as commodities, real estate, land, and timber.

Broadly, assets can be assigned to one of the core asset classes: stocks, bonds, cash and real estate. An asset mix breakdown helps investors understand the composition of a Portfolio. Indeed, the asset mix of a Portfolio is an important consideration for investors. It can be a key determinant of the risk/reward profile of the fund, and it can also provide insight into the long-term performance expectations.

Across the industry, Portfolio managers use many different methodologies to determine the asset mix of a Portfolio. Modern Portfolio Theory provides a basis for analyzing investments and determining appropriate allocations based on risk preferences and risk management objectives. Commonly, Portfolios are a blend of both equity and fixed income asset classes, as the balance of risk and potential return through the use of both equity and fixed income investments overall is a guiding principle in determining the asset mix of an Investment Portfolio.

Asset Allocation and Risk Allocation

As previously mentioned, Asset Allocation is the set of activities for the definition, composition, and optimization of a Portfolio of financial assets. It is equivalent to implement the process by allocating risk factors, and in this case, we are dealing with Risk Allocation.

Interestingly, Portfolio construction practices have recently shifted from an asset allocation-centered process to a more comprehensive risk allocation-based process. The current Risk Allocation frameworks consider multiple dimensions of risk and return trade-offs when building Portfolios and evaluate consequences of risk allocation decisions on normal and stressed markets.

Following the traditional Portfolio modeling techniques, investors have built up their Portfolios focusing on how much to allocate to different asset classes. Recent changes in Portfolio theory have prompted an evolution in the field of Asset Allocation. The most significant innovations concern:

1. Replacement of balanced Portfolios by separate asset classes, including asset classes such as foreign market equities.
2. Birth of the “style box” as investors hired separate managers to focus on large-cap, small-cap, growth, and value stocks.
3. Broader adoption of real estate and other forms of private investments (e.g. venture capital and buyout funds).
4. Addition of distressed securities, commodities, natural resources, and various kinds of hedge funds.

Yet the problem became that several of these more recently introduced asset classes actually have common risk factors that cross-asset class boundaries. To clarify matters, investors increasingly have constructed Portfolios on the basis of the role they expected different kinds of investments to play in the Portfolios themselves (i.e. role-in-portfolio exposures), even if they still allocated investments to traditional asset classes.

The Risk Allocation Framework takes this evolution a step further by considering not only the role that different investments might play in the Portfolio but how and in what ways such investments contribute to or mitigate various forms of Portfolio risk. The Framework combines careful attention to Risk Allocation in the context of the risk sensitivities and limitations of a long-term investment portfolio (LTIP) given its role in the broader organization.

Risk Allocation Framework is primarily based on four main components:

Business Review: Simplify and clarify the process for identifying the degree of dependence and integration of the LTIP in the total business and identifying any constraints on Portfolio construction. This facilitates informed decision making about appropriate fundamental exposures.

Policy Setting: Set top-down objectives to clearly express investors' most timeless and fundamental risk tolerances and objectives. The policy reflects desired role-in-portfolio exposures, value-added performance objectives, and common risk factors of equity beta, illiquidity tolerance, and foreign currency risk. The policy is designed to provide those implementing Portfolios with the appropriate guidelines for meeting long-term objectives.

Implementation: Determine allocations to most effectively implement investment policy objectives in the current environment. Implementation includes all decisions that result in differences between the actual Portfolio and the policy Portfolio. It is important to measure and monitor implementation decisions to make sure risks taken are consistent with conviction about their potential value added relative to policy.

Ongoing Performance Monitoring: Use performance measurement and attribution analysis to understand the ways in which value has been added to the Portfolio. Performance measurement serves as a feedback loop into continuous improvement in Portfolio Management.

The Risk Allocation Framework's primary merits are that it enables investors first to more rigorously construct Portfolios designed to realize their investment objectives and second to understand much more clearly how best to manage such a Portfolio dynamically to improve the likelihood that it performs as anticipated.

Overall, the Asset/Risk Allocation process is based on the systematic management of the composition/diversification of the Portfolio to achieve the highest levels of efficiency.

The main result of this process is the division of the Portfolio into investment classes (or risk factors), which makes it possible to create a Portfolio:

- That satisfies the imposed constraints;
- Efficient;
- Able to achieve the established goals;

The Asset Allocation (or Risk Allocation) process consists of a sequence of main activities:

1. The definition and formal quantification of the objectives of the investment activity and the time horizon to which it must be carried out;

2. The definition of restrictions and limits on investment activity and therefore the identification of the Investible Universe (the set of Feasible Portfolios);

3. Estimation of expected values (risk, returns, and correlations) between the feasible investment classes and the selection of the related benchmarks (market indices);

4. The identification of the Efficient Frontier of the Investible Universe in an evolved and disciplined optimization model;

5. The selection of an efficient Portfolio (or set of Portfolios) following a testing activity (Stress Testing and Scenario Analysis) to identify the most robust and resilient Portfolio;

6. Proceed with the construction and investment of the Portfolio with the assigned allocation.

Portfolio Management for Pension Funds

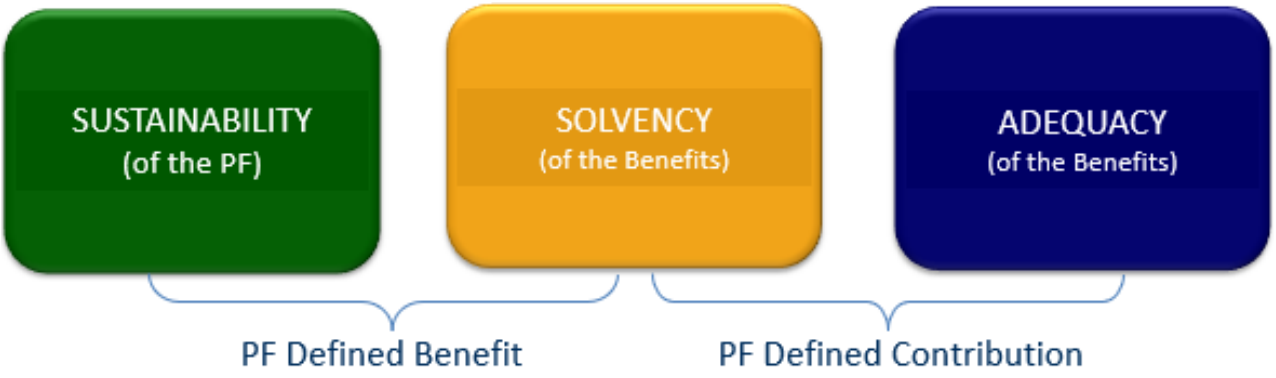
First of all, it is important to keep in mind that there are two main types of pension plans:

In a **Defined-Benefit Plan**, the employer (or sponsor) guarantees that the employee receives a definite amount of benefit upon retirement, regardless of the performance of the underlying investment pool. The employer is liable for a specific flow of pension payments to the retiree, and if the assets in the pension plan are not sufficient to pay the benefits, the company is liable for the remainder of the payment.

In a **Defined-Contribution Plan**, the employer (or sponsor) makes specific plan contributions for the worker, usually matching to varying degrees the contributions made by the employees. The final benefit received by the employee depends on the plan's investment performance: The company’s liability to pay a specific benefit ends when the contributions are made. Because this is much less expensive than the traditional pension, when the company is on the hook for whatever the Fund can't generate, a growing number of private companies are moving to this type of plan and ending defined-benefit plans.

As previously stated, a Risk for a Pension Fund can be defined as the occurrence of attaining a benefit level lower than the targeted objective or incurring in an underfunding scenario.

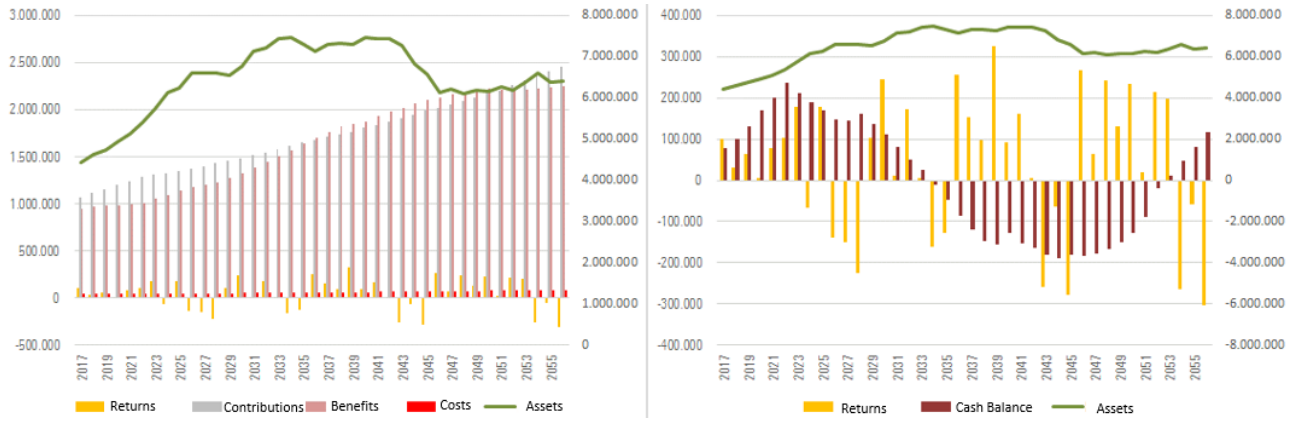
The Objective for a Pension Fund is described by three main features:



A Pension Fund has to manage its activities and operations setting as its primary objective the payment of adequate Benefits, that is sustainable over time.

Therefore, it is easy to understand that the main risk associated with the Pension Fund Objectives is: not being able to pay pensions. This scenario may occur as a result of a lack of financing or insufficient means of payment, due to inadequacy with respect to the function.

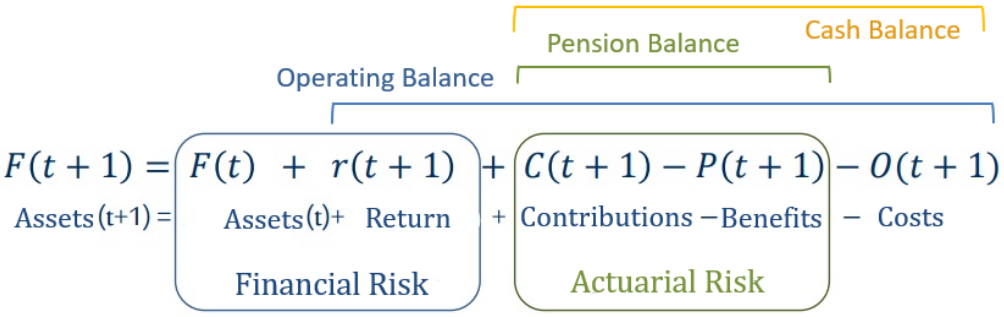
The returns arising from the assets of the Pension Fund represent only one of the possible instruments to be used in order to match the predefined Objectives.



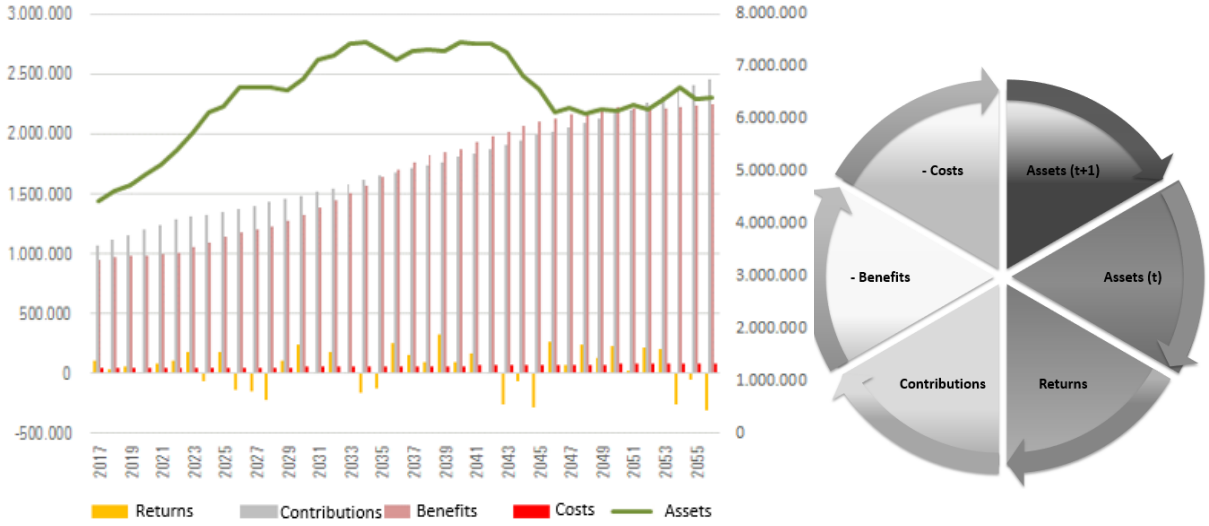
The framework depicted in the chart above makes it possible to understand that the riskiness of a Pension Fund depends on:

- Liabilities (the term structure of liabilities)
- Contributions (the term structure of contributory flows)
- The available Assets (quantity and quality)

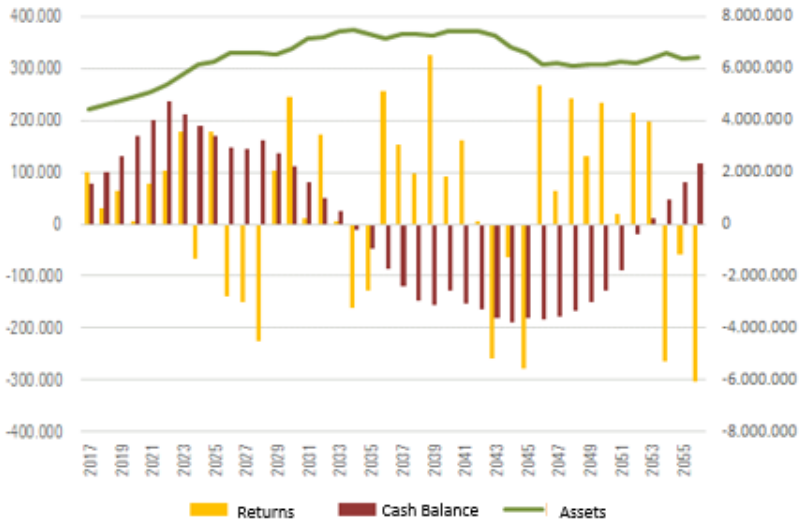
Defining the liabilities is important, as Pension Funds need to reserve assets each year to plan for future benefit payments. The evolution of the assets of a Pension Fund can be represented by the following Recursive Equation:



The effects of each component of this function on the Assets of the Pension Fund can be graphically understood by taking into consideration the chart below:



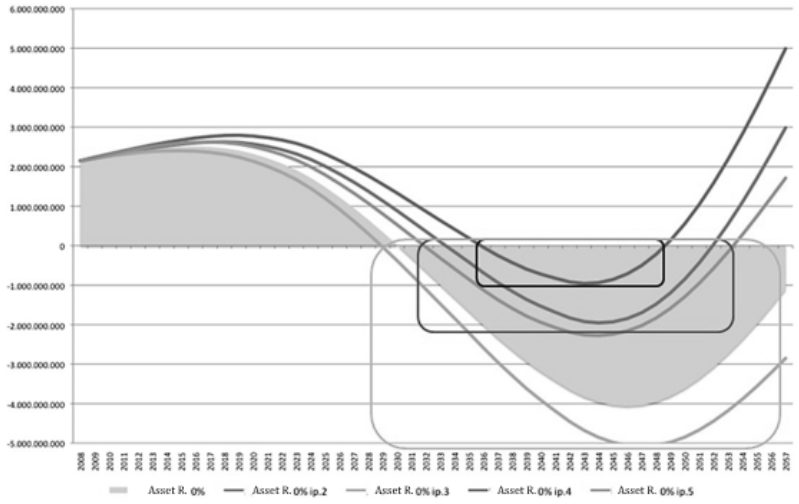
Each Pension Fund has a required return assumption that is used to calculate the annual contribution. The required return is also a key driver of asset allocation, as investment policy is set in an attempt to earn the required return. That is, plans with higher required return assumptions may pursue a more aggressive asset allocation in order to earn the investment profits needed to justify both the current level of benefits promised as well as the contributions.



The first form of liability-financing consists of:

- Payments/contributions
- Assets

The non-hedged portion (GAP) must be financed by returns.



- Decreased contribution flows,
- Increases in benefits, or
- Losses in asset management

can determine different levels of coverage (GAP) and therefore require necessary actions to maintain the level of funding.

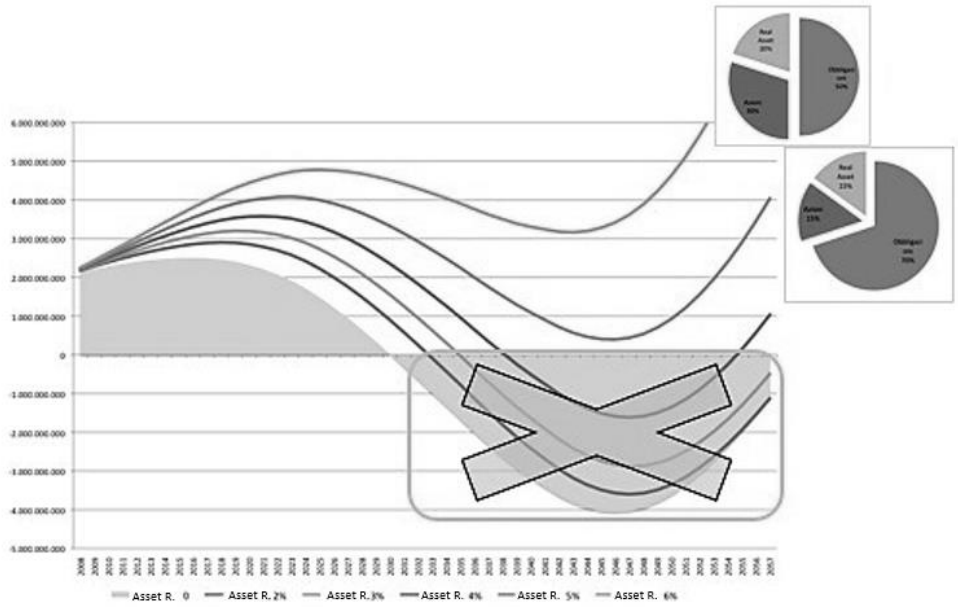
Pension Fund Managers have conflicting goals when designing the Asset Allocation of the plan. The first goal is to earn a high return on pension assets, which will be used to reduce the long-term contributions required to fund benefits. The second goal is to minimize the degree of underfunding or the amount of Surplus Risk incurred in the plan.

The surplus risk of a pension plan is the tracking error of the assets relative to the present value of the liabilities. The Volatility of Pension Assets and Liabilities creates surplus risk. Funds wishing to reduce surplus risk may have a very large fixed-income allocation. While this reduces surplus risk, the large fixed-income allocation reduces the likely return on assets, which increases the plan sponsor's long-term contributions.

A possible solution for reducing the Surplus Risk is the Liability-Driven Investing (LDI) strategy, which seeks to reduce surplus volatility by building a portfolio of assets that produces returns that are highly correlated with the change in the plan's liabilities.

The simplest way to immunize pension liabilities is to invest in a corporate bond portfolio with a duration matching that of the liabilities. Other ways to reduce surplus risk include derivatives overlays, such as a swap receiving long-duration bond returns or a swaption that increases in value as interest rates decline

Indeed, the target return of a Pension Fund should cover the portion not financed by the other asset flows for the achievement of the Objectives

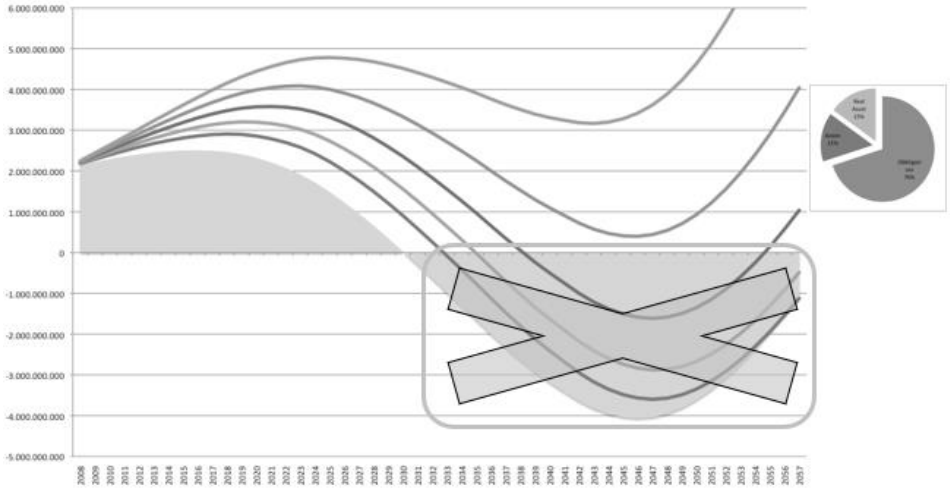


but obviously, it determines the exposure to the consequent Financial Risk.

$$F(t+1) = \underbrace{F(t) + r(t+1)}_{\text{Financial Risk}} + \underbrace{C(t+1) - P(t+1)}_{\text{Actuarial Risk}} - O(t+1)$$

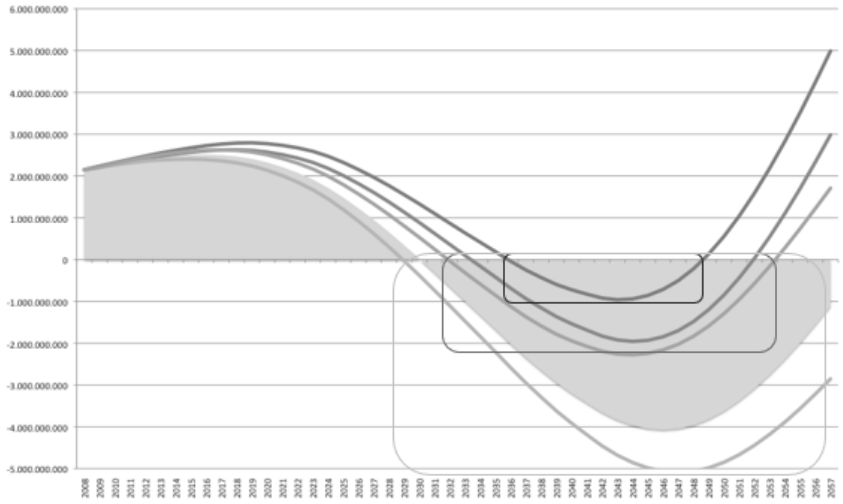
$$\text{Assets}(t+1) = \text{Assets}(t) + \text{Return} + \text{Contributions} - \text{Benefits} - \text{Costs}$$

An inconsistent or inefficient investment policy leads to an overload on Actuarial Risk.



Making sure that the assumptions in a model actually reflect real life is absolutely vital for all types of policies. Flaws in a model's assumptions could lead to premium mispricing. In the worst case scenario, an actuary may underestimate the frequency of an event, causing an increase in the frequency of payouts.

On the other hand, a weak or unbalanced actuarial model leads to an overhead in Financial Risk.

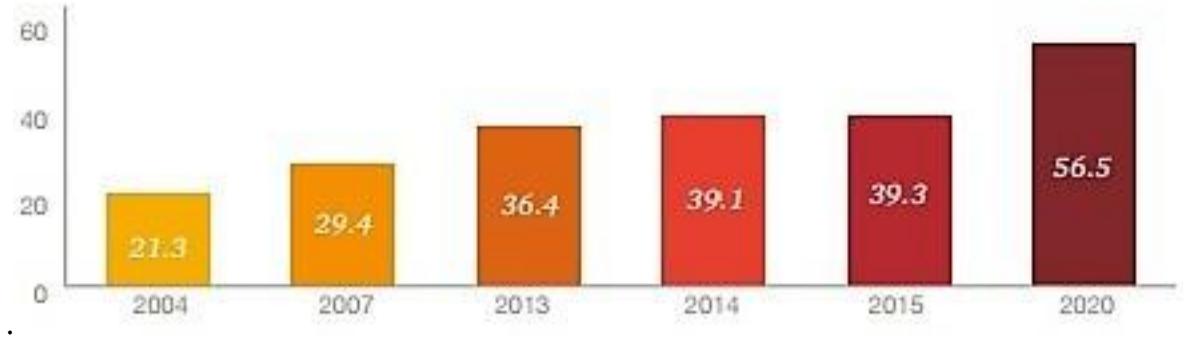


For both forms of risk, there are limits that cannot be overcome. In order to mitigate this risks, Pension Funds conduct Efficient Frontier analysis based on Markowitz' mean-variance model, focusing on improving the efficiency of their investments. Tracking error, which is the traditional risk measure for asset managers, is used by Pension Funds for monitoring their external investment strategy. Tracking error gets also applied in a risk budgeting concept. The Pension Fund allocates a strategically defined risk budget as the first step among asset classes and subsequently among the single investment managers compared to the chosen benchmark. Risk budgeting concepts were more recently developed for Pension Funds and have started to be implemented at large Funds, mainly since Asset Liability Management (ALM) tools have been increasingly employed by Pension Funds as integrated risk management systems.

Traditionally, Pension Funds have invested in the two main asset classes (bonds and equities) with a long-term investment perspective in line with the duration of their liabilities. In recent decades, Pension Funds have further diversified their Portfolios by successfully allocating assets to alternatives, such as private equity, real estate, infrastructure, and hedge funds.

Pension Funds are adapting their investment strategies to succeed in today's complex and demanding environment. The main trends consist in: asset allocation strategies prove to be a viable solution; balancing in-house asset management versus outsourcing can lead to a better control over performance and costs; sound governance structures ensure sound processes and organization.

The evolution of global Pension Fund's Asset value in USD trillions is reported below.



A Pension Fund's Asset allocation generally must balance risk, return, and costs. Several drivers can spur a market shift in Pension Fund's asset allocations and they should not be considered independently, but rather as an ecosystem in which each influences the others. The main drivers include diversification, risk management, hedge against inflation, asset and liability management.

Diversification is absolutely necessary. Whereas Pension Funds have traditionally invested in fixed income solutions, they are increasingly looking at equity and alternatives as a way to bolster returns. Geographical diversification is also vital as correlated risk within a country can decrease returns. A best practice would be diversifying in mixed assets as well as other geographical regions.

Having this in mind, a pension investor must set an investment Objective that:

- Is appropriate to the financing of the commitments (liabilities) of the Fund, given the knowledge of the assets the Fund will probably receive from the members;
- Is useful to members or is able to provide adequate services;
- Takes due account of the risk appetite, and especially of the willingness to accept losses due to market conditions.

Setting a goal that does not include:

- The long-term balance of the Pension Fund, or

- That does not enhance the investment time horizon of the members

means exposing to the maximum possible risk, that means not fulfilling its institutional function.

The objectives feed into the process of allocation and management of assets. Hence, the Portfolio MUST be consistent with the objectives of the investor. Therefore,

1. It is advisable to consider a complete range of investment opportunities, not excluding any Asset Class/Market without any reason.

2. It's important to recall that the constraints affect the riskiness and efficiency of the Portfolio.

3. It is appropriate to measure and evaluate the impact of each constraint on the Portfolio efficiency, as the consequences of the constraints are complex and often not very intuitive.

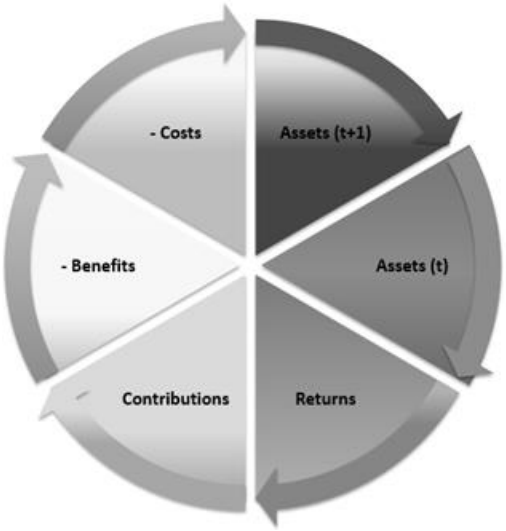
4. The investment time horizon and the liquidity profile of the Pension Fund must be valued.

5. The Investible Universe, the limits/constraints and the investment time horizon must be appropriate and consistent with the Objectives.

6. Individual investments and investment decisions must be assessed as a priority for the contribution to the riskiness of the Assets of the Pension Fund.

7. Performance (risk, return, efficiency, etc.) must be evaluated constantly with adequate procedures to be able to effectively intervene on the Portfolio.

8. Short-term decisions cannot affect the pursuit of long-term results.



The risk of a Pension Fund manifests itself as Asset Liabilities Mismatching, due to:

- an unexpected increase in the amount of the benefits, or their anticipation;
- an unexpected reduction in the amount of the contributions;
- the identification of an insufficient or incoherent target return;
- an inability of the Assets to pay for benefits (liquidity risk);
- a financial loss, or the failure to achieve the target return.

The fundamental safeguards to manage the riskiness of the Pension Fund are:

1. The Asset Liability Management

The Integrated management on an ongoing basis of Assets (contributions and assets) and Liabilities (benefits and expenses) is the most important safeguard for reducing the negative impacts of unexpected changes in benefits and contributions. ALM provides a strategic risk management system for long-term investors who pursue objectives and have to meet liabilities. The optimal investment policy is derived in a complex system that simulates all relevant features and constraints. ALM moved from a static and deterministic to a dynamic and stochastic analysis. Scenario analysis was introduced and, today, sophisticated ALM models employ economic cascade models to simulate the market variables.

2. The liquidity of Assets and positions

The liquidity of the Assets has to be consistent with the structure of the Liabilities, and it has to allow for possible updates on the target profitability of the Assets. The liquidity of individual positions must not lead to an inappropriate increase in Financial Risk (Specific Risk) and Operational risk.

3. Portfolio Concentrations

The Asset Management of a Pension Fund has to be carried out in such a way that Concentrations do not reduce the diversification of the Portfolio or lead to an inappropriate

increase in Financial Risk (Specific Risk), Operational Risk and a reduction in the liquidity of the Portfolio.

4. Conflicts of interest

The decision-making process, the management and the investment activity must be carried out in the exclusive interest of the underwriter. Any conflicting or potentially conflicting interest must be identified, assessed and eliminated or otherwise contained.

In addition to consistently updating investment strategies, Pension Funds are increasingly looking at bringing certain Asset Management activities in-house to keep tighter control of the fiduciary duty, while making sure that the project selection is in the best interest of their affiliates. Integrating robust in-house investment teams which enable Pension Funds to commit to their long-term strategy is a top priority in the current Pension Fund global framework.

Moreover, as a matter of fact, to succeed in today's dynamic and precarious market, it will be necessary for Pension Funds to have strong governance structures that hinder conflicts of interest on the one hand, while leading to a balance in different vital areas to improve performance.

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The Pension Fund System in Italy:
Market Structure, Regulation and Supervision

Davide Cipparrone, Andrea Canavesio and Giuseppe Spaziante

Abstract

Although compulsory Social Security plays a central role in the current European economies, it is time to resort to Supplementary Pensions.

Over the last two decades, the First Pillar of the Pension System, consisting of a state-run standardised Pension Scheme offering basic coverage and primarily focusing on reducing poverty, has significantly narrowed the scale of its intervention, partly as a result of the widening gap between promised performance and available resources. As a matter of fact, it is broadly acknowledged that the Public Social Security Systems of major industrialized countries currently provide way lower pensions than in the past.

Historically, the presence of a "pay-as-you-go" system has guaranteed a fair degree of economic security to those who finished working, hampering the development of Supplementary Pensions. A "pay-as-you-go" system is based on the principle of solidarity between generations: the retirement benefits of those who cease their employment are ensured by the contribution paid by current workers, charging the national budget for any residual difference. As a result, it is possible to witness a redistribution of income between different generations of beneficiaries: from a practical point of view, elderly people are economically supported by the younger generations, who in turn will receive the same treatment upon retirement.

Some structural key factors burden on the sustainability of the state-run configuration regulating the Pension System. The most significant features may be traced in the growing "old-age dependency ratio" (representing the ratio between people over 64 years old and total workforce), as well as in an increasingly aging population, in a longer life expectancy, in the reduction of activity rate (people of working age employed in a regular activity), in the high level of unemployment and finally in the reduction of the birth rate. Additionally, it is straightforward to understand how the current demographic changes, exacerbated by the crisis, will tend to depress economic growth and simultaneously increase pressure on the public finances.

Indeed, all these issues will impact on the replacement rate, given by the ratio between the first annual retirement income and the latest annual salary, representing the main indicator for figuring out how much each retiree will earn. This measure constitutes an estimate for the change in gross income of the employee in the transition from an active phase of quiescence, as well as a common measurement for the effectiveness and efficiency of the Pension System as a whole.

Consequently, new Social Security instruments were introduced in order to integrate the First Pillar, with the ultimate aim of offering the overall achievement of an adequate standard of living. Workers, both dependent and autonomous, were inevitably put in the condition of having to build their own Social Security portfolio from two components of retribution: the

Public Pension, prevalent in that constitutes the most significant periodic flow, and the Supplementary Pension.

In order to compensate for the imbalance of pensions, the System will move toward the development of Supplementary Pensions as an essential tool aimed at building an annuity pension in addition to the public one, so as to allow workers to have an income during the period of retirement that is not too inferior with reference to that received during their working lives.

The implementation process will focus on Defined Contribution Pension Funds, in which the amount of payments made is established directly by the member. However, the benefits received are not established in advance and cannot be determined with certainty: in fact, these depend on how they flow over time, as well as on the occurring accrued returns.

Therefore, in general terms, it is possible to observe that the amount of the contributions paid (Defined Contribution) is known, while, on the other hand, the extent of the benefits is indefinite.

Intuitively, the advantage in favour of the adhering members consists in the fact that they will receive what they have accrued over the period at stake, without having to bear the costs that would otherwise be required in order to contribute for the establishment of the Fund's reserve and those intended to meet the commitments.

However, along with these advantages, subscribing members will incur in the disadvantage of not being able to define a priori the extent of what they will actually perceive at the time of their retirement.

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Background Analysis: National Pension Fund System

Pension Funds were initially introduced in Italy in 1993 through the Legislative Decree n. 124/93, in conjunction with a major reform on the First Pillar. However, the legislative process eventually allowed for the complete implementation of Pension Funds only in 1997, giving rise to the establishment of the modern configuration of the national Pension Fund System.

Currently, with exceptions regarding public employees' Pension Funds and the so-called "old" PIPs, all Pension Funds are regulated by Legislative Decree n. 252/05, which reformed the legislative approach concerning Pension Funds and repealed the previous Legislative Decree n. 124/93.

As a matter of fact, Pension Funds were already available before 1993, and they were developed exclusively for particular categories of workers in selected firms (mainly in the Banking and Insurance industries and in major multinational corporations). These Funds are known as Pre-Existing Pension Funds, and their regulation currently overlaps for most aspects with that of Pension Funds introduced after 1993.

Commonly, the Supplementary Pension Schemes, whose supervision is entrusted to the Pension Fund Supervisory Commission (COVIP), an Italian independent specialised authority, represent the Second and Third Pillars of the National Pension System, in which membership is free and occurs on a voluntary basis (albeit strongly encouraged by State tax reliefs).

The main typologies of Pension Funds are:

1. Contractual Pension Funds (Fondi Pensione Negoziali/Chiusi)

   Only supporting occupational pensions, these Funds are closed to workers not pertaining to a given economic sector or professional category, and they are typically set up by Collective Bargaining Agreements.

2. Open Pension Funds (Fondi Pensione Aperti)

   Promoted by Banks and Insurance and Investment companies, they support both occupational and personal pensions and are "open" to the general public.

3. Individual Insurance Pension Plans – PIPs (Piani Individuali Pensionistici)

   Unit-linked policies and traditional life policies promoted by Insurance companies with specific characteristics common to all Pension Funds. They only support personal pensions.

4. Pre-Existing Pension Funds (established before November 1992).

Generally, employees are characterised by a "Defined Contribution" Pension Scheme, according to which the amount of contributions to be paid is determined at the time of the enrolment in the Pension Fund. The final accumulated amount depends on the level of contribution, the length of the period of participation, and the yield obtained from the investment of contributions excluding taxes and annuity conversion coefficient. On the other hand, the "Defined Benefit" regime, in which the

amount of the pension is predetermined in relation to the income obtained, is restricted to Pre-Existing Funds, though it is admitted for freelancers and self-employed workers.

Contractual Pension Funds

Contractual Pension Funds are Supplementary Pension Schemes whose origin is of a contractual nature. Contractual Pension Funds are independent legal entities, set up through Collective Bargaining Agreements (CBAs) between employers' associations and trade unions.

These Pension Funds are targeted to the following specific categories of workers:

- Private employees belonging to the same contractual category, the same company or group of companies, and the same territory;
- Civil servants who belong to specific segments of bargaining;
- Working partners of cooperatives;
- Self-employed workers and freelancers organised according to professional and territorial areas.

The majority of Contractual Pension Funds shall be typically set up as a result of:

- Collective Bargaining Agreements and Company agreements, involving representatives of employers and workers;
- Agreements between the working partners of cooperatives;
- Agreements between freelancers and self-employed workers sponsored by their trade unions or associations.

For self-employed workers, the establishment of contractual Pension Funds may be carried out by Occupational Social Security Schemes, provided the implementation of a separate management with respect to the resources allocated to compulsory insurance.

Contractual Pension Funds for State Government employees, whose employment relationship is governed by collective bargaining, involve collective agreements that can be set up according to the sector or to the geographical area in special autonomy Regions.

The activity of the Fund is governed by the Statute. This document defines the identifying elements of the Fund (name, establishment and purpose, recipient scope), its features (the amount of the contributions, the method of calculation of benefits, investment policies and cost participation of the recipients), the organizational profiles (the bodies of the Fund and the administrative structure), and the relations with members (membership and information to be provided to subscribers).

Traditionally, Funds do not directly handle the accumulated resources (contributions and related earnings), but they typically delegate this task to specialized external operators (banks, insurance companies, investment companies, asset management companies), that carry out this activity according to regulatory limits and criteria stipulated through specific agreements. Managers, throughout the administration of the entrusted resources, must follow the recommendations on the investment policy determined by the Board of Directors of the Pension Fund.

Pension Funds' financial resources are deposited into a Custodian Bank. Management entrusts the Custodian Bank with Purchase and Sales orders regarding those securities in which the financial resources are invested, and the Bank verifies that these indications comply with the law and with the provisions laid down in the Statute of the Pension Funds.

Open Pension Funds

Open Pension Funds are open to the general public, meaning that the beneficiaries of these Funds are not limited to a particular group of people or employees. Indeed, the enrolment in these Funds, which can occur on an individual or collective basis, applies openly to employees, self-employed workers, freelancers, working partners of cooperatives, people without income supported by other individuals and retirees. This type of funding is directly promoted by companies in the financial sector (banks, insurance and asset management companies, securities firms), and it constitutes a specific, separate and autonomous Asset, with the sole purpose of delivering pension provisions.

Differently from Contractual Pension Funds, Open Pension Funds' financial management is generally carried out by the company establishing the Fund itself. In such a case, the Custodian bank only plays a third party role. The designated Manager carries out its tasks independently, setting as a primary aim the interest of members, and ensuring that management occurs in compliance with rules, regulations and contractual provisions. The interest of members is also protected by the Supervisory Board, which verifies that the administration and the management of the Fund are both functional to the members' needs and consistently performed. The composition of the Supervisory Board varies depending on the type of Open Pension Fund.

PIPs

Individual Insurance Pension Plans (PIPs) are exclusively individual Supplementary Pension Schemes, addressed to all those who, regardless of their working situation, intend to ensure themselves a source of Supplementary income. As Open Pension Funds, PIPs are as well set in the form of autonomous Assets separate from the insurance company which establishes them, and they are intended solely for the payment of benefits to members. PIPs cannot be used to satisfy claims by creditors of the company in the event of bankruptcy of the latter.

PIPs are set up by insurance companies and they are implemented through:

- Life insurance contracts
- Unit-linked insurance policies

Pre-Existing Pension Funds

Pre-Existing Pension Funds are Supplementary Pension Schemes which were operating before the enactment of the Legislative Decree n. 124/93, the aforementioned legislation that has regulated for the first time the Italian Supplementary Pension System in a comprehensive way. On that occasion,

the Legislative Authority has allowed these Funds to continue operating as an exception to the general framework. This type of Funds represents a heterogeneous set of collective Supplementary Pension patterns, targeting specific sections of workers. They are divided into:

- Pre-Existing Autonomous Pension Funds provided with legal subjectivity (e.g. associations, foundations, charities);
- Pre-Existing Internal Pension Funds, set up within companies (e.g. banks, insurance companies).

Contributions to Pension Funds

The payment of contributions to a Pension Fund for employees is divided into three installments: the severance payment (TFR), the employer's contribution and the employee's contribution.

The Severance Payment, or TFR (Trattamento di Fine Rapporto), can be defined as an annual provision on the liabilities side of the balance sheet, relating to a part of salaries that employees perceive. Each year, the workers accrue a nominal return equal to 1.5% plus 75% of the inflation rate (this index is calculated from the FOI index provided by ISTAT).

The Supplementary Pension System assigns a prominent role to the TFR, which has the task of supporting and nurturing the development of Supplementary Pensions. Upon termination of employment, which may occur for any reason, employers must pay this TFR severance indemnity to all employees[38].

Thanks to the freedom of choice guaranteed to workers, the TFR deriving from companies can be transferred to different Supplementary Social Security Schemes. From 1st January 2007, it is possible to join a sectoral insurance or Pension Fund, through the granting of individual termination benefits, without the obligation to pay additional contributions, either by the employee or by the employer.

The TFR can also be transferred to a single Pension Fund without the possibility of subdividing it into different instruments. However, workers must be aware that the decision to confer TFR to Supplementary Pensions is irreversible and does not allow "second thoughts": once the will to join is explicitly expressed, employees can no longer restore TFR within the company. The TFR, reviewed annually, becomes the main source of funding for Supplementary Pension Schemes.

If employees decide to retain the TFR within the company, at any time they may change their mind and choose to adhere to another Pension Scheme. The decision to transfer the TFR to Supplementary Pensions can be expressed either explicitly, by choosing one of the Supplementary Schemes available, or in a tacit way, leaving the future settlement to be transferred by the employer to collective agreements or to the residual fund established at the INPS called FONDINPS.

The employer may decide to recognize an additional contribution to support those who want to join Supplementary Pension Schemes. Usually, this contribution is provided in the collective agreement

[38] Pension System Design

or in an employment agreement, but the employer can also decide to pay this additional contribution in the absence of a collective agreement and even if the employee chooses a Pension Scheme provided by the agreement itself. In the case of adherence to a Contractual Fund, when there is a contribution paid by the employee and the latter is suspended, the institutional sources (Collective Bargaining) may also provide for the suspension of the employer's contributory obligation towards the company of employment.

Similarly, if the employees, after at least 2 years of subscription to the Fund chosen by collective agreement, decide to transfer their position to another Supplementary Scheme, they may lose the right to the employer's contribution. It is therefore extremely important to know the limits and procedures dictated by collective agreements or by companies themselves.

Employees are free to determine the amount of the contributions: in addition to paying the TFR, they may decide to allocate an extra amount to the funding of the selected Supplementary Pension Scheme.

In the presence of collective agreements, the methods and the minimum amount of employee's contributions are determined on the basis of fixed amounts, or as a percentage of salary or income. In the case of self-employed workers, the minimum contribution to be paid shall be freely determined, unless the chosen Pension Scheme does provide for a minimum contribution threshold. It is recalled that the deductibility of contributions from the individual taxable income is limited to 5,164,57 euros per year. Any employees' contribution is included within this threshold for tax purposes.

On the other hand, the Benefits provided by the Pension Fund can be paid:

- in the form of a lump sum;
- in the form of an annuity.

With regards to benefits paid in the form of a lump sum, such benefits may be provided according to their present value, up to a maximum of 50% of the final accumulated amount, while the remainder must be provided necessarily in the form of an annuity. In order to identify the maximum amount payable in a lump sum, any amount already paid in advance and not reinstated by the member must be deducted from the final aggregate.

The amount paid out for pension payments will be the difference between the final accumulated amount and the results thus obtained. In the event that the anticipations exceed the final accumulated amount, it must be fully paid in the form of an annuity.

Supplementary Pension benefits paid in the form of capital shall be subject to taxation for their total amount, net of the part corresponding to the income already taxed.

Similarly, Supplementary Pension benefits paid as annuities are taxed for their total amount, net of the part corresponding to the income already taxed and net of capital gains arising from the yields

of the amount the individual position gained, giving rise to pension benefits in the course of delivery, if determinable.

Additionally, as regards to benefits paid in the form of capital, a withholding tax is applied to the taxable amount of the paid benefit, at the rate of 15%. Furthermore, a rate reduction equal to 0.30% is planned for each year exceeding of the fifteenth year of participation to the Supplementary Pension Scheme, with a maximum reduction equal to 6%.

Market Structure Analysis

Ten years after the launch of the reform, and more than 20 years since the introduction of the first comprehensive legal outline, the Italian Supplementary Pension Fund System is provided with a very well-structured framework. Operational models, competitive conditions and Pension plans' transparency and comparability gave rise to an advanced system, capable of proving its validity in the international comparison, as well as with respect to the new European Directive in the field of Pension Funds (so-called IORP2), to be transposed into national law by January 2019.

Many Supplementary Pension Fund initiatives have now reached a significative development stage, both in terms of size, members, and asset management.

	Funds	Members		ANDP		Contributions	
		Number	Var. % 2016/2015	Assets	Var. % 2016/2015	Assets	Var. % 2016/2015
Contractual Pension Funds	36	2,597,022	7.4	45,931	8.0	4,623	3.4
Open Pension Funds	43	1,258,979	9.5	17,092	10.8	1,779	11.2
Pre-existing Pension Funds	294	653,971	1.3	57,538	4.0	3,753	0.9
New PIP	78	2,869,477	10.3	23,711	18.2	3,734	11.3
Total	**452**	**7,416,762**	**8.2**	**144,347**	**8.2**	**13,896**	**5.7**
Old PIP		411,242		6,931		360	
Total		**7,787,488**	**7.6**	**151,278**	**7.8**	**14,256**	**5.0**

At the end of 2016, the Supplementary Pension Funds were 452 in total, totalling 7,787,000 members, and increasing by 7.6% with respect to the previous year. Taking into account multiple adhesions (about 620,000 cases), the actual number of members was 7,170,000 million. The participation rate was 27.8% of the labour force.

The total Assets under management reached €151.3 billion, 7.8% higher than 2015. Assets held by Pension Funds amounted to 9% of GDP and to 3.6% of Italian household financial assets.

The increase in resources, about 10.9 billion euros, was determined by gross contributions amounting to € 14.2 billion, compared with gross outflows for benefits and other Social Security management items adding up to € 6.9 billion. The balance, consisting of net profits and gains on financial management, recorded a positive 3.6 billion euros value, thanks to the overall favourable trend in the prices of stocks and bonds in the main global markets.

As previously mentioned, at the end of 2016 Pension Funds operating in the system were 452[39], and they consisted of:

[39] The total includes FONDINPS

- 36 Contractual Pension Funds;
- 43 Open Pension Funds;
- 78 "new" PIPs;
- 294 Pre-Existing Pension Funds (of which: 187 Autonomous Funds and 107 Internal Funds);

Complementary Pension Funds number

(data at the end of each year)

	2000	2006	2007	2010	2013	2014	2015	2016
Contractual Pension Funds	42	42	42	38	39	38	36	36
Open Pension Funds	99	84	81	69	58	56	50	43
Pre-existing Pension Funds	578	448	433	375	330	323	304	294
autonomous	*399*	*307*	*294*	*245*	*212*	*204*	*196*	*187*
non autonomous	*179*	*141*	*139*	*130*	*118*	*119*	*108*	*107*
New PIP	-	-	72	76	81	78	78	78
Total	**719**	**574**	**629**	**559**	**509**	**496**	**469**	**452**

Compared to 2015, a decrease of 10 Pre-Existing Funds and 7 Open Funds may be observed, while Contractual Pension Funds and PIPs remained unchanged. The number of Pension Funds decreased continuously since the year 2000, when the start-up phase of the new sectorial discipline introduced by the Legislative Decree 124/93 had ended, particularly affecting the Pre-Existing Funds. Compared to the initial amount of 719, the total number of Pension Funds went down to 452 by the end of 2016, recording a decrease equal to 267 Funds.

In greater detail, Contractual Pension Funds reduced by 6, Open Pension Funds reduced by 56 and Pre-Existing Pension Funds recorded a 284 decrease. As a matter of fact, it should be noted that "new" PIPs and FONDINPS were introduced in the system only from 2007 onwards.

Pre-Existing Pension Funds had continuously involved in rationalization and consolidation processes, mainly performed as a result of the internal reorganization of large and medium-sized banking groups. For Pre-Existing Pension Fund, cost containment was often accomplished through the elimination of duplications in performing the same functions from multiple Pension Schemes.

Concerning the Contractual Pension Funds, the model of delegated management allowed for significant cost savings, thanks to the bargaining power in the purchase of financial and administrative management services. In such kind of Pension Funds, there are now well-established experiences in which the costs applied represent particularly competitive levels, even in an international comparison.

On the other hand, the reduction recorded for Opens Pension Funds may be interpreted alongside corporate transactions, or as a result of revisions concerning the Offer Policies.

By the end of 2016, 36 companies operated in Open Pension Funds. Insurance companies represented 26 of those, while 9 asset management companies and 1 bank accounted for the

remaining part. These companies collectively belonged to 27 groups, of which 13 operated within the insurance sector.

As regards to PIPs, they remained, by definition, an exclusive prerogative of insurance companies. Overall, by the end of 2016, 37 companies actively operated on the market, of which 20 managed Open Pension Funds as well. Out of the total 78 PIPs operating at the end of the year, 30 were closed to new entries, compared with the 28 PIPs for the year 2015.

Private Pension System. Distribution of pension funds by assets.
(*end-2016 data; assets in millions of euros*)

Size classes (assets)	Contractual Pension Funds		Open Pension Funds		"New" PIPs		Pre-existing Pension Funds		Total[1]	
	Number	Assets	Number	Assets	Number	Assets	Number	Assets	Number	Assets
> 5,000	2	15,788	-	-	-	-	1	10,174	3	25,962
2,501 to 5,000	1	3,313	1	3,285	3	10,599	3	10,494	8	27,690
1,001 to 2,500	10	15,869	3	3,855	3	6,049	9	14,015	25	39,787
501 to 1,000	11	8,537	10	6,860	2	1,444	9	6,097	32	22,938
101 to 500	9	2,197	11	2,423	20	4,254	54	12,447	94	21,321
25 to 100	3	227	11	599	16	989	62	3,249	93	5,138
1 to 24	-	-	7	71	33	376	108	1,054	148	1,501
< 1	-	-	-	-	1	-	48	9	49	9
Total	**36**	**45,931**	**43**	**17,092**	**78**	**23,711**	**294**	**57,538**	**452**	**144,347**

(1) FONDINPS is included.

At the end of 2016, the Pension Schemes with more than a billion in accumulated resources were 36 (13 Contractual Funds, 4 Open Funds, 6 PIPs and 13 Pre-Existing Funds), compared with 32 of 2015. These Funds held 93.4 billion euros in Assets (80.5 in 2015), representing 65% of the total accumulated resources (60% in 2015). The Size Class ranging between 500 million and 1 billion euros gathered 32 Schemes (11 Contractual Funds, 10 Open Funds, 2 PIPs and 9 Pre-Existing Funds), adding up to a total value of accumulated resources equal to 23 billion euros.

Conversely, Funds managing resources below 25 million euros were 197 (203 in 2015), for an accumulated total value of 1.5 billion euros (just 1% of all the resources allocated to benefits). Moreover, no Contractual Fund featured in this Size Class, which instead included 7 Open Funds, 34 PIPs, and 156 Pre-Existing Funds.

Private Pension System. Distribution of pension funds by members.
(end-2016 data)

Size classes (members)	Contractual Pension Funds		Open Pension Funds		"New" PIPs"		Pre-existing Pension Funds		Total[1]	
	Number	Members	Number	Members	Number	Members	Number	Members	Number	Members
> 100,000	6	1,612,808	2	451,876	7	2,087,866	-	-	15	4,152,550
50,001 to 100,000	7	448,390	6	366,233	3	238,947	2	144,452	18	1,198,022
200,001 to 50,000	11	434,296	9	301,485	8	234,262	7	197,300	36	1,204,656
10,001 to 20,000	3	38,024	6	85,533	10	162,068	3	44,704	22	330,329
1,001 to 10,000	9	63,504	16	51,691	32	138,325	65	234,812	122	488,332
100 to 1,000	-	-	4	2,161	16	7,875	70	31,076	90	41,112
< 100	-	-	-	-	2	134	147	1,627	149	1,761
Total	**36**	**2,597,022**	**43**	**1,258,979**	**78**	**2,869,477**	**294**	**653,971**	**452**	**7,416,762**

(1) FONDINPS is included.

An additional analysis can be developed considering the number of active members in the Supplementary Pension Funds System. More than half of Pension Schemes totalled less than 1,000 members (239 out of a total of 452), accounting for a total number of members equal to 43,000. Again, no Contractual Fund was included among this Class, which instead included 4 Open Funds, 18 PIPs, and 217 Pre-Existing Funds. Additionally, out of 149 total Schemes with less than 100 members, there were 147 Pre-Existing Funds and 2 PIPs. The total number of subscribers to these Schemes reached about 1,800 members. Indeed, there still remained many Funds in the system with a severely limited number of active members: in most cases, these were represented by Pre-Existing Funds, exclusively targeting retirees (75 retiree-exclusive Schemes by the end of 2016).

Italian Complementary Pension Funds. Numbers of Funds and Members

	Number of Funds	Members			
		2016	var. % 2016/2015	New members	Number of members get out
Contractual Pension Funds	36	2,597,022	7.4	251,000	73,000
Open Pension Funds	43	1,258,979	9.5	133,000	24,000
Pre-existing Pension Funds	294	653,971	1.3	26,000	18,000
New PIP	78	2,869,477	10.3	312,000	43,000
Total	**452**	**7,416,762**	**8.2**	**691,000**	**126,000**
Old PIP		411,242			23,000
Total		**7,787,488**	**7.6**	**691,000**	**139,000**

The aggregated data pertaining to the overall number of Pension Fund members, relative to both the total amount and the individual values for each Pension Scheme, was obtained through the sum of memberships reported for each period relative to each Scheme. The sole exception concerns "old" PIPs, for which the duplication cases registered with respect to "new" PIPs belonging to the same insurance company have already been deducted from the overall total starting from 2007. However,

although not systematically, it has been known for some time that there exist cases in which some groups of employees actually adhere concurrently to multiple Pension Schemes.

At the end of 2016, the total number of members of Supplementary Pension Schemes amounted to 7.787 million, increasing by 7.6% with respect to the previous year. This figure includes the aforementioned duplication of members adhering to multiple Pension Schemes. The extent of this phenomenon encompasses approximately 620,000 cases. Consequently, referring to the System as a whole, the number of members subscribed to at least one type of Pension Scheme ("actual members") can be estimated at around 7,170,000.

During the year, new memberships, net of all internal transfers, reached 691,000 units, revealing a relatively dynamic configuration: with the exception of years 2007 and 2015, characterized, respectively, by the launch of the reform and by the sudden registration of the entire construction workers' category to the relevant Scheme, in recent years the flow of new members had never exceeded 500,000 units.

251,000 new subscriptions converged toward Contractual Funds, of which 148,000 arose from the Contractual Mechanism implemented for construction workers starting from 2015. At first application, the system determined the coverage of all Funds concerned. Then, the number of subscriptions continued to grow even in the later stages, following the newly employed trends, with many actors still remaining in those Funds even when they were no longer employed in the sector. Besides these, new Contractual Funds memberships were 103,000, compared to 71,000 of 2015.

Open Pension Funds confirmed the signs of recovery highlighted in 2015. New membership stood at 133,000 units, the highest value since the reform, with an additional strong participation of "new" PIPs, approximately 312,000 new members (279,000 in 2015). The tacit consent of TFR remained marginal: approximately 15,400 people signed up, for the most part converging toward Contractual Funds and FONDINPS (about 1,400 members).

Complementary Pension Funds. Silent partecipations of private employed workers

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Contractual Funds	62,900	42,000	22,700	14,400	15,900	11,600	10,100	9,400	8,900	12,900	210,700
Open Funds	1,400	1,500	1,400	200	100	100	200	100	300	300	5,600
Pre-existing Funds	2,900	2,800	1,700	1,200	1,500	1,100	900	800	600	800	14,500
Total	67,300	46,300	25,800	15,800	17,500	12,800	11,200	10,300	9,800	14,000	230,800
Fondinps	7,400	12,900	16,100	5,000	3,800	1,400	1,200	600	1,100	1,400	37,300
Total	**74,700**	**59,200**	**41,900**	**20,800**	**21,300**	**14,200**	**12,400**	**10,900**	**10,900**	**15,400**	**268,100**

Since 2007, there had been 268,000memberships through tacit consent of TFR, of which approximately 211,000 concerned Contractual Funds and 20,000 involved Pre-Existing and Open

funds. As regards to FONDINPS, adhesions were 37,300, of which only 6,000 involved contributions made in 2016.

The outflows from the system during 2016 have been 139,000, recording a decrease of approximately 19,000 compared to the previous year. Total Redemptions represented the largest share: approximately 77,000 against 98,000 in 2015. The remaining portion is provided by Provisions of retirement benefits in the form of a lump sum (59,000) and by Individual positions converted into annuities (2,600), showcasing few changes with respect to the previous year.

The retirement benefits recipients, which roughly amounted to 118,000 at the end of 2016, were almost exclusively handled by Pre-Existing Funds. On the other hand, Individual positions transferred within the System added up to 174,000, in line with previous years.

Contractual Pension Funds subscribers in 2016 amounted to 2,597,000 members, recording a 7.4% increase with respect to the previous year. Of the total figure, approximately 630,000 derived from Contractual Mechanism activated from 2015 onwards and concerning the construction industry.

Regardless of contractual adhesions, the balance between new entries and exiting outflows during 2016 was approximately 33,000 units, coming back to a positive figure for the first time since 2008.

Instead, Open Pension Funds, with 1,259,000 adhering members, registered an increase equal to 9.5% during the same period. After losing momentum in the period following the launch of the legislative reform, as a consequence of which they witnessed a steady growth at an average compound annual rate of 3.5% from 2009 to 2012, these Pension Funds recorded an average annual growth rising up to 8.3%.

“New” PIPs totalled 2,869,000 subscribers, recording a 10.3% increase from 2015. Even though displaying lower growth rates than those recorded in the period following the launch of the reform, PIPs consolidated their leading position in terms of number of members. As a matter of fact, including nearly 411,000 members of "old" PIPs and excluding multiple memberships overlapping among “new” and “old” PIPs, the Individual Insurance Pension Plans segment registered about 3.2 million adherents, constituting 42% of the entire Italian Supplementary Pension System.

Finally, approximately 654,000 subscribers to Pre-Existing Funds and 37,300 members of FONDINPS completed the overall picture.

According to professional status, memberships regarding employed workers in 2016 amounted to 5.8 million. In addition to Contractual and Pre-Existing Funds, adhesions concerning "new" PIPs accounted for 1.7 million, while Open Funs reached 655,000 subscribed employed workers.

Complementary Pension Funds. Members for professional status.
(data at the end of 2016)

	Employed workers	Self-employed workers	Total
Contractual Funds	2,591,196	5,826	2,597,022
Open Funds	655,831	603,148	1,258,979
Pre-existing Funds	632,654	21,317	653,971
New PIP	1,756,115	1,113,362	2,869,477
Old PIP	143,166	268,076	412,242
Total	**5,788,432**	**1,999,056**	**7,787,488**

The 433,000 memberships increase recorded in 2016, in comparison with the results of 2015, may be explained by taking into consideration the aforementioned adhering mechanism of construction workers, which contributed on its own for one-third of the registered growth. “New” PIPs and Open Funds registered, respectively, an increase equal to 187,000 and 67,000 units.

When it comes to self-employed workers, including in this definition also freelancers and unemployed individuals, the overall Italian Supplementary Pension Fund System encompassed approximately 2 million members.

The most significant related Pension Schemes were represented by “new” PIPs, comprising more than 1.1 million members, and by Open Funds, encompassing 600,000 subscribers.

Among public sector employees, employment initiatives subscribers accounted for 194.000 individuals, of which about 100,000 pertaining to the school sector.

Italian Pension Funds: Asset Allocation

During the accumulation phase, the administration of the Fund requires the definition of the Strategic Asset Allocation, consisting of the long-term allocation of resources among the various asset classes: bonds, equities, liquidity, etc. According to the Strategic Asset Allocation, Pension Funds invest members' contributions in financial and real assets markets.

The process of Asset Allocation requires the preliminary identification of socio-demographic, income and risk tolerance characteristics of the members, in order to optimally allocate financial resources, given the long-term time horizon. Once the Allocation framework has been defined, the Fund is provided with a benchmark, with reference to which operating results may be measured and reviewed. This benchmark is an objective parameter, formed through indices and compiled by independent third parties, that synthesizes market trends in which the Fund's resources are invested. However, the comparison with a financial benchmark is not compulsorily requested, as Funds are usually required to reach a certain targeted performance, established ex-ante. This managerial approach is defined "Total Return", as it merely focuses on absolute return achievement, untethered by the logic of a benchmark.

Supplementary Pension Schemes offer a variety of alternatives in which to invest the contributions of members, called investment lines or investment options. Members select their preferred investment lines within the offered options, or even a combination of different Portfolios.

The investment options differ based on the financial instruments that are purchased accordingly. Italian Pension Funds offer 4 different investment lines:

- Bonds, investing only or mainly in bonds and resulting in a low level of risk;
- Guaranteed, offering a certain minimum return and the repayment of the capital paid;
- Balanced, generally investing in stocks and bonds in the same percentage, hence favouring a continuity of results and showing a moderate risk exposure;
- Equity, investing only or mainly in stocks and responding to higher long-term return needs, with a consequent greater exposure to risk.

The adherent's initial choice regarding the investment option is not binding: over time, each adherent could change the selected path, switching from one investment line to another. Moreover, it is possible for Pension Scheme subscribers to adopt the so-called "Life Cycle Model", investing primarily in Equity at the beginning of the career, and gradually moving towards Bond portfolios.

At the end of 2016, the Italian Pension Fund System totalled 117.3 billion euros in resources, approximately 10.2 billion euros more than in 2015[40]. In the allocation among the main asset classes, the proportion invested in bonds represented 61% of the total, three-quarters of which consisted of government bonds. 16.3% of assets were invested in equity investments, and 13.5% in

[40] This aggregate excludes the actuarial reserves held by existing Funds at insurance companies and internal funds

Collective Investment Undertakings (OICR). The percentage of cash deposits stood at 6.4%. Bond investments amounted to 71.5 billion euros (compared to 67 billion euros in 2015). On the other hand, the decline in the percentage invested in government bonds continued: 54.5 billion euros in 2016, accounting for 46.5% of the total (decreasing from the 49.1% percentage recorded in 2015).

The Italian government bonds, equal to 31.1 billion euros, decreased from 28.2% to 26.5% of assets. Instead, German government bonds increased from 5.5% to 6.1%, for a total of 3.3 billion euros, as well as French government bonds, increasing from 9% to 10.5% for a total of 5.7 billion euros, and Spanish sovereign bonds, rising from 9.8% to 11.9% of the assets, and totalling 6.5 billion euros at the end of the year. Corporate bonds corresponded to 17 billion euros (14.4 in 2015), 14% of the total, compared to 13.5% at the end of 2015. The proportion invested in corporate instruments issued by Italian companies stood at 2.3 billion euros (2.2 in 2015), accounting for 2% of total assets.

Equity investments amounted to 19.1 billion euros (17.9 in 2015), and equity securities issued by Italian companies amounted to around 1.1 billion euros (1 billion in 2015). Collective Investment Undertakings (OICR) stood at 15.8 billion euros (13.7 in 2015), accounting for 13.5% of assets, compared to 12.8% in 2015. The value of real estate funds stood at around 1.6 billion (1.5 billion in 2015), while the equity exposure, calculated including equity securities held through Collective Investment Undertakings, stood at 24.8%, a slight increase over the previous year.

The collection of real estate investments totalled 3.9 billion euros (4 in 2015), of which 1.9 represented Foreign Direct Investment, while the remainder consisted of real estate companies investments and units of real estate funds, the latter almost for the entire prerogative of Pre-Existing Funds. The overall picture is completed by deposits, including liquidity and repurchase agreements: 7.5 billion euros (5.2 in 2015), equal to 6.4% of the total (4.9% in 2015).

	Contractual Pension Funds		Open Pension Funds		Pre-existing Pension Funds		New PIP		Total	
	Importi	%	Importi	%	Importi	%	Importi	%	Importi	%
Cash and deposit	2,556	5.6	1,480	8.7	2,265	7.5	1,205	5.0	7,511	6.4
Sovreign bonds	25,532	55.6	6,886	40.3	9,952	32.8	12,129	50.8	54,554	46.5
of which: domestic	*12,036*	*26.2*	*4,154*	*24.3*	*5,343*	*17.6*	*9,554*	*40.0*	*31,137*	*26.5*
Other debt securities	6,175	13.4	997	5.8	4,058	13.4	5,760	24.1	17,000	14.5
of which: domestic	*490*	*1.1*	*173*	*1.0*	*492*	*1.6*	*1,131*	*4.7*	*2. 288*	*2.0*
Equities	8,667	18.9	3,154	18.5	4,817	15.9	2,443	10.2	19,081	16.3
of which: domestic	*472*	*1.0*	*237*	*1.4*	*265*	*0.9*	*153*	*0.6*	*1,127*	*1.0*
UCITS	3,063	6.7	4,546	26.6	6,165	20.3	2,068	8.7	15,846	13.5
of which: real estate	*24*	*..*	*3*	*..*	*1,473*	*4.9*	*142*	*0.6*	*1,642*	*1.4*
Real estate	-	-	-	-	2,261	7.5	-	-	2,261	1.9
Other assets and liabilities	-62	-0.1	30	0.2	812	2.7	280	1.2	1,060	0.9
Total	**45,931**	**100.0**	**17,092**	**100.0**	**30,330**	**100.0**	**23,885**	**100.0**	**117,313**	**100.0**
of which: domestic	*12,998*	*28.3*	*4,564*	*26.7*	*6,100*	*20.1*	*10,838*	*45.4*	*34,552*	*29.5*
Memory item:										
Equity exposure		22.9		41.3		23.6		18.2		24.8

With regard to investment in the Italian economy, at the end of 2016 Pension Funds employed 29.5% of their assets in domestic investments, down by 1.7% with respect to 2015, for a total amount of 34.6 billion euros (33.4 in 2014). Government bonds made up the largest share.

Securities issued by Italian companies remained virtually unchanged, constituting 3% of assets (2.9% in 2015), for a total value of 3.4 billion euros (3.2 in 2015), divided into 2.3 billion of bonds and 1.1 billion of equities. Almost all of this investments referred to listed securities.

Italian Pension Funds: Returns

By the end of 2016, aggregate returns, net of management costs and taxation, were on average positive for all types of Pension Schemes and for the respective investment lines. Returns were higher than the rate of revaluation of severance pay (TFR).

Pension Funds and New PIPs. Net yields.

(percentage values)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Contractual Pension Funds	**-6.3**	**8.5**	**3.0**	**0.1**	**8.2**	**5.4**	**7.3**	**2.7**	**2.7**
Guaranteed	*3.1*	*4.6*	*0.2*	*-0.5*	*7.7*	*3.1*	*4.6*	*1.9*	*0.8*
Pure Bond	*1.6*	*2.9*	*0.4*	*1.7*	*3.0*	*1.2*	*1.2*	*0.5*	*0.2*
Mixed Bond	*-3.9*	*8.1*	*3.6*	*1.1*	*8.1*	*5.0*	*8.1*	*2.7*	*3.2*
Balanced	*-9.4*	*10.4*	*3.6*	*-0.6*	*9.2*	*6.6*	*8.5*	*3.2*	*3.2*
Equities	*-24.5*	*16.1*	*6.2*	*-3.0*	*11.4*	*12.8*	*9.8*	*5.0*	*4.4*
Open Pension Funds	**-14.0**	**11.3**	**4.2**	**-2.4**	**9.1**	**8.1**	**7.5**	**3.0**	**2.2**
Guaranteed	*1.9*	*4.8*	*0.7*	*-0.3*	*6.6*	*2.0*	*4.3*	*0.9*	*0.7*
Pure Bond	*4.9*	*4.0*	*1.0*	*1.0*	*6.4*	*0.8*	*6.9*	*0.9*	*1.3*
Mixed Bond	*-2.2*	*6.7*	*2.6*	*0.4*	*8.0*	*3.6*	*8.0*	*2.2*	*1.4*
Balanced	*-14.2*	*12.6*	*4.7*	*-2.3*	*10.0*	*8.3*	*8.7*	*3.7*	*2.7*
Equities	*-27.6*	*17.7*	*7.2*	*-5.3*	*10.8*	*16.0*	*8.7*	*4.2*	*3.2*
New PIPs									
Separate management	**3.1**	**3.1**	**3.2**	**3.2**	**3.3**	**3.2**	**2.9**	**2.5**	**2.1**
Unit linked	**-21.9**	**14.5**	**4.7**	**-5.2**	**7.9**	**10.9**	**6.8**	**3.2**	**3.6**
Bond	*2.4*	*3.7*	*0.6*	*0.8*	*4.9*	*-0.3*	*3.3*	*0.6*	*0.4*
Balanced	*-8.3*	*7.8*	*2.5*	*-3.5*	*6.4*	*5.8*	*8.2*	*1.9*	*1.5*
Equities	*-32.4*	*20.6*	*6.7*	*-7.9*	*9.6*	*17.2*	*7.1*	*4.5*	*6.0*
Memory item:									
TFR	2.7	2	2.6	3.5	2.9	1.7	1.3	1.2	1.5

Contractual Pension Funds and Open Pension funds averaged 2.7% and 2.2% respectively. Again, after considering management and taxation, PIPs recorded returns of 3.6% for unit-linked products and 2.1% for Segregated Funds. During the same period, the revaluation of TFR was 1.5%.

Within each type of Pension Scheme, higher results were observed in lines with prevailing equity investments. Equity investment lines gained an average of 4.4% in Contractual Funds, 3.2% in Open Funds and 6% in PIPs. As regards to Balanced investment lines, returns of 3.2% were recorded for Contractual Funds, 2.7% for Open Funds and 1.5% for PIPs.

Concerning predominantly Bond investment lines, results were positive, although generally lower than those recorded by Balanced and Equity lines, reflecting a scenario still characterized by very low interest rates levels, also with respect to the historical pattern of interest rates. Pure Bond lines yielded 0.2% for Contractual Funds and 1.3% for Open Funds. As for the mixed Bond lines, higher returns were recorded for Contractual Funds (3.2%), compared to Open Funds (1.4%), while PIPs Bond lines achieved a return equal to 0.4%.

For Guaranteed investment lines, returns stood at 0.8% for Contractual Funds and 0.7% for Open Funds. The PIPs separate management earned 2.1%. Unlike other investment lines, these activities accounted assets using historical cost instead of market value and, therefore, any appreciation or depreciation impacted on the operating surplus only at the time of the actual realisation.

Pension Funds and New PIPs. Compound average annual yields.
(percentage values)

	1 year	2 years	3 years	5 years	10 years	17 years
Contractual Pension Funds	**2.7**	**2.7**	**4.2**	**5.2**	**3.3**	**3.1**
Guaranteed	*0.8*	*1.3*	*2.4*	*3.6*	-	-
Pure Bond	*0.2*	*0.4*	*0.6*	*1.2*	*1.5*	-
Mixed Bond	*3.2*	*2.9*	*4.6*	*5.4*	*3.7*	-
Balanced	*3.2*	*3.2*	*4.9*	*6.1*	*3.6*	-
Equities	*4.4*	*4.7*	*6.4*	*8.6*	*3.3*	-
Open Pension Funds	**2.2**	**2.6**	**4.2**	**5.9**	**2.6**	**1.9**
Guaranteed	*0.7*	*0.8*	*1.9*	*2.9*	*2.3*	*2.5*
Pure Bond	*1.3*	*1.1*	*3.0*	*3.2*	*2.9*	*3.0*
Mixed Bond	*1.4*	*1.8*	*3.8*	*4.6*	*3.0*	*3.1*
Balanced	*2.7*	*3.2*	*5.0*	*6.6*	*3.1*	*2.4*
Equities	*3.2*	*3.7*	*5.3*	*8.5*	*2.5*	*1.3*
New PIPs						
Separate management	**2.1**	**2.3**	**2.5**	**2.8**	-	-
Unit linked	**3.6**	**3.4**	**4.5**	**6.4**	-	-
Bond	*0.4*	*0.5*	*1.4*	*1.8*	-	-
Balanced	*1.5*	*1.7*	*3.8*	*4.7*	-	-
Equities	*6.0*	*5.2*	*5.9*	*8.8*	-	-
Memory item:						
TFR	1.5	1.4	1.4	1.7	2.3	2.5

Over the previous five years, an overall favourable period for financial markets, the average compound annual return was 5.2% for Contractual Funds and 5.9% for Open Funds. As to PIPs, the average compound annual return stood respectively at 6.4% for unit-linked products and 2.8% for separate management. The best results were achieved in Equity lines, with average values between 8% and 9%. The average annual TFR was equal to 1.7%.

Over a longer period of observation, which includes the start-up phase of Supplementary schemes and several periods of financial market turbulence, the average compound annual return of Pension Funds was positive (3.1%) and higher than TFR (2.5%). Additionally, Open Funds, characterized by higher equity exposure, averaged 1.9% a year (around 3% for Bond lines and 1.3% for Equity lines).

In addition to average values, it is useful to analyse the distribution of individual investment lines' returns among the different Pension Schemes. Contractual Funds' average annual returns were much less dispersed than those obtained by Open Funds and PIPs for all types of investment lines. Given the same Asset Allocation, the wide dispersion of returns of Open Funds and PIPs reflected the heterogeneity of costs across the Funds. Contractual Funds' returns stood approximately between 1.2% and 3.7% in Guaranteed lines and between 3.7% and 7.1% in Bond lines. Balanced lines recorded returns between 4.7% and 8.9%, while Equity lines varied between 7.3% and 9.3%.

With regard to Open Funds, the highest volatility was observed in Guaranteed and Bond lines, with returns ranging between 0.2% and 6.4%, and between 0.9% and 6.8% respectively. Balanced lines recorded an interval between 3.7% and 8.7%, Equity lines' returns fluctuated between 5.7% and 10.5%, and PIPs registered returns between 1.5% and 3.4% in separate management.

Italian Pension Funds: Costs

Another important aspect concerns the burden of fees requested by the financial manager for the placement, administration, and management of assets. During the accumulation phase, fixed percentages or figures may be withheld from payments made, or they can be collected to the same extent directly from the Fund.

To respond to demands for greater transparency and protection towards subscribers and new members of Pension Funds, COVIP introduced the so-called Synthetic Costs Indicator (Indicatore Sintetico dei Costi - ISC) aimed at measuring the financing costs. The peculiarity of this index is that it applies to all forms of new institution operating on the market, allowing for comparative analysis between the different conditions offered.

In order to compare the different Social Security offers available on the market, COVIP developed a methodology for calculating this synthetic indicator, which is common to all new schemes. The ISC is given by an estimated percentage calculated by referring to a "typical adherent" that pays an annual contribution of 2,500 euros and assuming an annual rate of return equal to 4%, computed over different time horizons of participation (respectively 2, 5, 10 and 35 years).

For the calculation, the standard costs applied are taken into account, without taking into consideration any subsidy granted to particular categories of members and any cost component with an exceptional nature, or in any case connected to unpredictable events or situations (for example, legal and judicial expenses).

In general, the ISC depends on the investment lines and on the selected distribution channel. Higher values are shown in connection with the increase in the Equity component of the investment line and in the market structure forms, such as Open Funds and especially PIPs, which make use of distribution networks whose remuneration hovers from the volumes placed. The ISC also depends on the related time horizon. Indeed, typically lower values are observed as the period of participation increases, as the incidence of initial fixed costs on the accumulated amount is reduced.

Pension Funds and New PIP. Synthetic costs indicator.

(data at the end of the year 2016;percentage values)

	Synthetic costs indicator			
	2 years	5 years	10 years	35 years
Contractual Pension Funds	1.0	0.6	0.4	0.3
Minimum	*0.5*	*0.3*	*0.2*	*0.1*
Maximum	*3.0*	*1.4*	*0.9*	*0.6*
Open Pension Funds	2.3	1.5	1.3	1.2
Minimum	*0.9*	*0.7*	*0.5*	*0.1*
Maximum	*5.1*	*3.4*	*2.8*	*2.4*
New PIP	3.9	2.7	2.2	1.8
Minimum	*1.0*	*0.9*	*0.6*	*0.4*
Maximum	*6.5*	*4.9*	*4.1*	*3.5*

In 2016, the average costs charged by various Pension Funds remained stable. The convenience of Contractual Pension Funds was confirmed. In fact, the average ISC stood at 1% over 2 years of participation, falling to 0.3% over the 35 years' time horizon. Over the same period, the ISC varied from the 2.3% to 1.2% in Open Funds and from 3.9% to 1.8% as regards to PIPs.

Pension Funds and New PIP. Synthetic costs indicator for different investment lines.

(data at the end of the year 2016;percentage values)

Investment lines		Indicatore sintetico dei costi			
		2 years	5 years	10 years	35 years
Guaranteed	Contractual Pension Funds	1.1	0.6	0.5	0.3
	Open Pension Funds	2.3	1.4	1.2	1.1
	New PIPs	3.7	2.4	1.9	1.4
Bond	Contractual Pension Funds	1.0	0.5	0.4	0.2
	Open Pension Funds	2.0	1.3	1.1	0.9
	New PIPs	3.5	2.4	2.0	1.6
Balanced	Contractual Pension Funds	1.0	0.5	0.4	0.2
	Open Pension Funds	2.4	1.6	1.4	1.3
	New PIPs	3.6	2.6	2.3	2.0
Equity	Contractual Pension Funds	1.2	0.6	0.4	0.2
	Open Pension Funds	2.8	1.9	1.7	1.6
	New PIPs	4.5	3.2	2.7	2.3

When taking into account the different types of investment lines, it is possible to notice that the most expensive lines are found in PIPs.

For Guaranteed and Bond investment lines, the differentials amounted to 2.5-2.6 percentage points compared to Contractual Funds and 1.4-1.5 percentage points compared to Open Funds for 2 years of participation, while these spreads dropped approximately by 1-1.4 percentage points and 0.3 percentage points respectively for 35 years of participation.

For Balanced lines, as regards the 2 years period, the cost increase for PIPs stood in the range of 2.6 points over Contractual Funds and 1.2 points on Open Funds, falling to 0.7 and 1.8 percentage points respectively over the longer time horizon.

Conversely, differentials found in the Equity lines were higher: on average, PIPs costed roughly 3.3 percentage points more than Contractual Funds and 1.7 points with respect to Open Funds over the 2 years of participation. These spreads remained significant even over the 35 years' time horizon.

Finally, Contractual Pension Funds exhibited an inverse relationship between the costs applied, which were already very competitive, and size, exploiting economies of scale generated by the distribution of administrative burdens on increasing asset values. However, this inverse relationship did not emerge within individual adhesions collecting Funds, and, in particular, when referring to PIPs, for which the increase of size was generally not followed by the lowering of costs.

Main Regulations

Legislative Decree 5/12/2005, n. 252

The numerous interventions recorded since 1993 addressed the need to fill those gaps that are lacking in discipline, while highlighting at the same time the demand for a significant boost to the development of Supplementary Pension Funds.

Therefore, it was necessary to implement a proper structural reform process on the subject, represented by the Legislative Decree No. 252 of 5th December 2005, which in turn implemented the Act No. 243 of 2004, whose effects have begun to occur starting from 1st January 2007.

The discipline is intended to recognize the equivalence between the different Pension Schemes and set a differentiation on the basis of the functional logic and on the executional and operational procedures.

Overall, the Legislative Decree 252/05 maintains certain aspects of continuity with the previous legislation, among which the most significant ones concern the principle of free adhesion to Supplementary Pension Funds, for which the voluntary nature of the choice is reiterated.

Art. 1 defines the objectives that the reform aims to pursue. As a result, Supplementary Pension Schemes are recognised with the fundamental task of "ensuring higher levels of risk protection implemented by establishing special Funds or separate Assets, whose name must contain the words Pension Fund".

Art. 2 continues with the identification of the entities able to subscribe a membership, gathering them into a single list. Instead, Art. 3 appoints a broad category of Pension Fund establishing procedures and subjects, in compliance with the legislative Authority's recognition, including:

- Contractual and Collective Agreements;
- National collective labour agreements signed by Trade Union representatives;
- Institutions and Companies, given the lack of collective agreements;
- Regional Authorities (through Regional laws);
- Financial Intermediaries (e.g. banks, asset management companies and insurance companies).

Depending on the nature of the tutoring subject, Art. 4 identifies various types of Pension Schemes and defines the process of authorisation for each of them, while Art. 5 and Art. 6 define rules laying down the managing, monitoring and responsible Bodies.

As a result of this legislative evolution, COVIP experienced a significant increase in its responsibilities and powers. Indeed, its supervisory role concerns ensuring transparency and fairness of conduct as well as prudent management of Pension Funds. Overall, COVIP's fundamental task can be traced in ensuring the proper functioning of the whole Pension Fund System.

An additional ground-breaking element is represented by the introduction of the principle of portability, through which workers can transfer their positions to another Supplementary Pension Scheme. Finally, the tacit consent of TFR and the updated tax regime may be detected as further innovative foundations introduced by the Legislative Decree 252/2005.

Resolution 16/03/2012: Provisions on the Investment Policy Implementation Process

The Administrative Board of each Pension Fund shall issue a document on investment policy. This document aims to define the financial strategy that the Pension Schemes intend to implement in order to obtain, from the use of the resources entrusted, efficient risk-return combinations in a time frame consistent with the Social Security needs of members. The document identifies:

a) The objectives to be achieved in financial management;
b) The criteria to be followed for its implementation;
c) The tasks and responsibilities of the subjects involved in the process;
d) The system for monitoring and evaluating the results achieved.

The document must be subject to a periodic review, at least every three years. The ultimate goal of the investment policy is to pursue efficient risk-return combinations in a given period of time. In order to reach this final objective, the Pension Fund defines the number of investment lines it deems useful to implement, their risk-return combinations, the possible adoption of life-cycle mechanisms and their functioning. To this end, the socio-demographic characteristics of the reference population and its Social Security needs must be carefully analysed.

For each investment line, the expected annual average return and its "variability" over the management time horizon must be specified and expressed in number of years. Furthermore, on the basis of past experience, it should also be indicated the likelihood with which the return on investment, over the management period, could be less than a certain limit.

To achieve the financial objective of each Fund, the document must in any case clearly identify:

1. The Strategic Asset Allocation (the percentage distribution among the various asset classes). The equity/bond composition and the average duration of financial bonds must be consistent with the management period. In case of benchmark strategies adoption, the market indicators selected to represent the aforementioned asset classes and their burden on the Fund's assets must also be reported, while in the event of non-benchmark strategies, the guidelines to be followed to ensure the stated objective must be indicated;
2. The definition of the selected financial instruments and the associated risks.

Additionally, for a complete evaluation of the managerial approach, the document must indicate:

I. The maximum level of annual turnover rate, defined by COVIP as the minimum value among purchases and sales, divided by the average assets;

II. In case of benchmark strategies, the maximum level of annual variability of return differences between the benchmark and the managed portfolio (e.g. volatility tracking error indicator);
III. In case of non-benchmark strategies, absolute risk indicators consistent with the goal set;
IV. For delegated Pension Funds, the investment lines characteristics;
V. The monitoring mechanisms of risk-return ratios in an ex-post perspective, identifying a methodology of financial results analysis in terms of risk-return patterns to the contributing factors (performance attribution).

With regard to Contractual and Pre-Existing Pension Funds with legal subjectivity, the Resolution divides the main functions of the different actors involved in the investment process as follows:

1. The Management Board of the Pension Fund:
   - Defines and adopts the investment policy;
   - Decides the assignment and dismissal of management mandates;
   - Periodically reviews the investment policy, and if necessary modifies it;
   - Exerts control over the activities carried out by the financial advisor;
   - Approves the internal control procedures of financial management;
   - Defines the approach for exercising the voting rights of the Pension Fund.

2. Investment Committees:
   - Formulate recommendations to the Board;
   - Evaluate proposals made by Financial Advisor and Investment Management Function;
   - Periodically check the investment policy and, if necessary, propose the necessary amendments to the Board.

3. Financial Advisor and Investment Management Function:
   - Contribute to defining the investment policy;
   - Engage in the investigation for the selection of asset managers, and submit the proposed entrustment and revoking of mandates to the Board;
   - Check the financial management by evaluating performance over time. For this purpose, they develop a periodic report on the situation of each Fund mandate for the Board, together with an assessment of the degree of risk assumed in relation to the performance achieved. In the event of significant changes in the risk-return levels arising from policy investment, they shall issue a report of an extraordinary nature, to be addressed to the Board;
   - Monitor the implementation of strategies and evaluate the work of Asset managers;
   - Make proposals to the Board regarding new market developments and investment policy changes that may be necessary;
   - Collaborate with all the subjects involved in the investment process (Asset managers, Custodian Bank etc.) in order to provide the necessary support regarding aspects of the strategy to be implemented.

4. Asset managers:

- Manage assets according to mandate, in order to replicate the benchmark and to achieve extra returns;
- Transmit a periodical report to the Board defining the policies adopted.

5. Custodian Bank:
   - It is the custodian of assets, performs the activities entrusted to it by law and carries out the additional activities entrusted to it by the fund ;
   - transmits any additional information that may be requested by the Fund, in order to supply the monitoring system.

Ministerial Decree 2/09/2014, n. 166

The Decree of the Ministry of Economy and Finance of 2 September 2014, n. 166, was published in the Official Journal No. 264 of 13th November 2014, and it implemented Art. 6 paragraph 5-bis of the 5 December 2005 Legislative Decree n. 252, laying down rules on the investment criteria and limits concerning Pension Funds' resources and on conflicts of interest.

The Decree 166/14 replaced the previous Decree of the Ministry of Economy and Finance of 21 November 1996, n.703, pursuing a new approach in regulating investment restrictions in the Italian Pension Fund System.

Decree 166 came into force from 28th November 2014. However, Pension Funds registered in the list held by COVIP pursuant to Art. 19, paragraph 1 of Legislative Decree 252/05, had 18 months to comply with the new provisions.

As a matter of fact, the types of financial assets in which the Fund may invest are clearly specified, implicitly excluding those not listed. The maximum percentages of investment are determined for each category of financial instrument, and the regulation provides general qualitative criteria to be followed, such as sound and prudent management, diversification and cost reduction.

The Decree is primarily concerned with providing general rules concerning investment policies and universal criteria to be followed in managing the available resources of Pension Funds. In particular, Decree 166 requires that Pension Funds:

- Pursue an optimization of the profitability-risk combination of the portfolio as a whole, through the selection of the best instruments for quality, liquidity, efficiency, and level of risk, in line with the investment policy adopted;
- Pursue an efficient management, designed to maximize operating results, reduce transaction costs and operational costs, in relation to the size, the complexity and the characteristics of the portfolio;
- Achieve a proper portfolio diversification, aimed at limiting the concentration of risks and the dependence of results on certain issuers, business sectors and groups, or geographical areas;

- Adopt investment strategies consistent with the risk profile and the time structure of the liabilities, so as to ensure the continuous availability of suitable and sufficient assets to cover liabilities, with the objective of financial equilibrium as well as profitability and liquidity of investments, favouring financial investment with a low degree of risk, also by resorting to bonds issued or guaranteed by either a Member State of the European Union, a member country of the OECD or a public international body to which one or more Member States of the European Union belong;
- Implement adequate professional and technical procedures and organizational structures, appropriate to the size and complexity of the Portfolio, to the investment policy they intend to adopt, to the risks assumed in management and to the percentage of investments made in instruments not traded on regulated markets, adopting investment processes and strategies tailored to their characteristics and for which they are able to establish, implement and maintain congruous policies and procedures for monitoring, managing and controlling risk.

In addition, Pension Funds are called upon to verify the management results, by adopting benchmarks that are consistent with the objectives and criteria indicated in the investment policy document and, where applicable, in the management agreements. At the same time, they must bear specific reporting obligations towards COVIP, which controls, among other things, the adequacy of the organizational, professional and technical structure and the policies and procedures for monitoring and managing risk.

With reference to the eligible financial instruments, and without prejudice to the prohibition on borrowing and granting loans and the provision of guarantees in favour of third parties, Decree 166 allows Pension Funds to:

- Perform repurchase agreements and securities lending, for the purpose of efficient portfolio management, carried out within a standardized system, organised by a recognised clearing and guarantee body or concluded with counterparties of primary reliability, soundness and reputation, and subject to the supervision of a public authority;
- Hold liquidity, in accordance with the provisions of the investment policy adopted, without specific limits;
- Use financial derivative contracts, stipulated exclusively for the purpose of reducing investment risk or increasing management efficiency.

On the other hand, the Decree does not admit the possibility of short selling and prohibits derivative transactions equivalent to short sales.

The Decree also provides that Pension Fund's assets shall be invested to a predominant extent in financial instruments traded on regulated markets, while investing in securities not traded on regulated markets and in Alternative Investment Funds (FIA) should be maintained at prudential levels, and overall within the limit of 30% of the overall Pension Fund's assets. Decree 166 also revises the concentration limits. In particular, Pension Funds, taking as well into account the exposure deriving from investments in derivative instruments, shall not invest more than 5% of

their total holdings in securities issued by the same subjects, and not more than 10% in securities issued by entities belonging to a single group.

Specific conditions are also envisaged for investments in Collective Investment Undertakings (OICR). With particular reference to financial instruments connected to commodities. Decree 166 clarifies that Pension Funds may invest in such instruments within the limit of 5% of their overall asset, provided that they are issued by counterparties of primary reliability, soundness, and reputation, while derivative contracts connected to commodities for which there is the obligation to physically deliver the underlying asset at maturity will not be admitted.

In any case, COVIP retains the right to determine cases in which the limits placed on the investment policies of Pension Funds can be exceeded due to proven requirements of the Fund.

At the same time, COVIP maintains the right to establish more stringent limits to the operation of Pension Funds, in relation to their financial situation and with regard to the adequacy of their organizational structure.

Governance and Supervision of the Pension Fund System

The Italian Supervisory Authority for Complementary Pension Schemes is called COVIP (Commissione di Vigilanza sui Fondi Pensione). It is a collegiate body whose members are appointed by decree of the President of the Republic following a deliberation of the Council of Ministers, adopted on the proposal of the Minister of Labour and Social Policies in consultation with the Minister of Economy and Finance.

The Commission consists of a President and two Commissioners.

The President represents and convenes the Commission, he presides over the meetings and determines the agenda by regulating the discussions and the voting sessions. Furthermore, his duties include the supervision of the preliminary activity of the Commission and the implementation of the deliberations. From an institutional perspective, the President maintains relations with Government bodies, with the Parliament, and with other national and international institutions and, moreover, he informs the Minister of Labour and Social Policies on major action and crucial events, by providing any requested information to the competent agencies.

On the other hand, the Commissioners take part into in the discussion and they are involved in deliberations. Their role comprises the proposal of initiatives concerning the activity and functioning of COVIP, as well as the collegial monitoring activity of the Authority's ongoing operations.

As a matter of fact, the Commission may decide to delegate its own representation to one of the Commissioners, when specific circumstances arise.

Both the President and the Commissioners have a term of office of 7 non-renewable years.

Over the years, COVIP has assumed tasks and responsibilities ever larger than those expected at the time of its establishment.

The main task it is required to perform may be essentially identified in the function of guaranteeing and ensuring transparency and accuracy in the management and administration of Pension Funds.

To this end, COVIP :

- Provides the authorisation to Pension Funds to carry on their business, and approves their statutes and regulations;
- Keeps record of those Pension Funds authorized to carry out Supplementary Pension activities;
- Supervises the accurate technical, financial, accounting and asset management of Pension Funds and it oversees the adequacy of their organizational structure;
- Ensures compliance with the principles of transparency in the relationships between Pension Funds and their own members;
- Provides individuals with an improved understanding of Pension Schemes, through the collection and distribution of useful information concerning this sector.

Moreover, COVIP has the power to advance legislative changes regarding the Supplementary Pension System.

Education and Information

The booklet “Guida Introduttiva alla Previdenza Complementare” represents an easy-to-read publication that, at the introductory level, aims to provide an answer to all those who want to know how the Pension Fund System operates. It has a predominantly informative purpose and it represents a useful tool to learn about the Supplementary Pension System. Moreover, it includes fact sheets, examples, charts and tables as well as a glossary to help understand the terminology used within the field.

This Guide was developed by COVIP, and it uses a simple, direct and confidential language with the declared purpose of illustrating what Supplementary Pensions are. Furthermore, it showcases the various Pension Schemes alternatives and provides the necessary information in order for the reader to select the appropriate Pension Scheme that best suits his characteristics.

Of course, notwithstanding the validity of this Guide, the Authority makes it clear that the booklet does not replace the information contained in the documents (Statutes, Regulations, key information documents, Sample Projects) that the Supplementary Pension Schemes shall make available to the parties concerned and that should be carefully analysed in anticipation of a membership

subscription, as indeed prescribed by COVIP Regulation of 29th May 2008 governing arrangements for the access to Pension Schemes.

Delving into the structure of the Guide, the introductory part illustrates the evolution of the Pension System legislation, by analysing the methods of calculating the quiescent treatments (pay-as-you-go and contributory method) and assessing the possible impacts in terms of replacement rates determination and as a result of the pension gap. Subsequently, it outlines the objectives of Pension Schemes, describing how they have to be pursued through a systematic planning process which takes into account multiple aspects relating to the subscriber, such as age and life cycle.

The next step in the Guide concerns the examination of Supplementary Pension Schemes functioning, analysing features such as Contributions, Financial accumulation, and Benefits, while also exploring TFR's structure and its trade-off with Pension Funds. Additionally, the Guide provides the identification and the cataloguing of the different Pension Schemes, describing the main features of Contractual, Open, Pre-Existing Funds and PIPs and outlining their fiscal discipline.

Moreover, the Guide contains a reference to the cost reminder illustrating the potential impacts on the determination of final performance. Thereby, COVIP reports the incidence of incurring costs on Supplementary Pension Scheme, inviting readers to refer to the Synthetic Costs Indicator, available on its website, which provides a cost-benefit analysis referring to each Pension Scheme.

Remarkably, COVIP's website features a self-evaluation questionnaire "Conoscere per Scegliere", used to assess the general level of knowledge concerning the Pension System, as well as an interesting video providing basic information about the field, named "10 Cose da Sapere sulla Previdenza Complementare".

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