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Evaluation and Measurement of the Internal Performance of the Civil Regime of the Moroccan Pension Fund

Latifa Aitoutouhen* PhD student. University Abdel Malek Essâadi , Polydisciplinary faculty, Tetouan, Morocco

Faris Hamza Professor of Higher Education. University Abdel Malek Essâadi, Polydisciplinary faculty, Tetouan, Morocco

Abstract: The civil pension scheme of the Moroccan pension fund is 'Bismarkian', contributory and mandatory. This pay-as-you-go system finds its foundation in social justice and intergenerational equity. The evaluation of the sustainability and viability of this scheme can not be carried out solely by the financial component, even if this criterion is essential to ensure the confidence of the affiliates. It also requires consideration of other criteria to ensure its ability to meet its commitments and achieve its objectives. This paper proposes to analyze and evaluate the internal civil regime performance of the Moroccan Pension Fund (CMR) based on the identification and measurement of indicators of three main parameters: generosity, equity, and the inter and intra generational redistribution.

Keywords: Internal performance indicators; Inter and intra generational equity; Generosity; Redistribution and contribution; The civil regime of the Moroccan pension fund.

1. Introduction

Retirement is one of the fundamental pillars of social protection. It aims to provide replacement income for the elderly, to combat the risk of poverty and to preserve social cohesion.

The majority of pension systems are based on the pay-as-you-go principle. This one, based on solidarity and intergenerational equity, consists of financing the pensions of a given period, with resources collected during the same period.

Equity as a cornerstone of social security, refers to treatment not equal but fair between citizens. Everyone must be able to withdraw benefits from a pension system proportional with his or her efforts to fund it. In this sense, the viability of the pension system can not be taken for granted if intergenerational equity is not properly monitored and evaluated. As a result, the issue of equity remains at the heart of pension plans.

Any pension system is a means of redistributing money from one group to another. Thus, questions of the sustainability of the system over time, the sharing of the contributory effort and the possibly redistributive nature of the regime are acute.

Generosity, a concept frequently used in the literature on pension systems, is an explanatory variable for the internal performance of pension plans. It can be deducted from pensions paid to pensioners.

Thus, the objective of this paper will be to analyze and evaluate the internal civil regime performance of the Moroccan Pension Fund (CMR) through the measurement of indicators of three parameters: generosity, equity, and inter and intra-generational redistribution.

After an introduction, we present in the second section a theoretical framework on pension systems including their appearance, foundation and their principle, in particular the pay-as-you-go system. Similarly, the discussion in the economic literature of approaches to inter- and intra-generational equity, redistribution and contribution, and the generosity of pension systems will be addressed in this section. The third section will be devoted to the presentation of the chosen methodology and the results of the analysis will be presented in the last section. Finally, we conclude with a conclusion.

2. Review of the Literature

We distinguish two main ways of organizing social protection, in particular the pension system: social insurance originating in Bismarck and the model of assistance proposed by Beveridge.

*Corresponding Author

2.1. Retirement System

In the literature, most studies only measure retirement in one way. Some authors such as Gustman and Steinmeier (1984), Honig and Hanoch (1985), Ruhm (1990), Smeeding and Quinn (1997), Gustman and Steinmeier (1999) and Stone (2003) are interested in the issue of retirement and have used several different methods : The age at which a person will be retired, the self-reporting of the person's retirement, the person's retirement, salary or hours is reduced when the person has terminated his career or has left his principal employer, when the person is receiving benefits from an employer's pension plan and is receiving benefits from a universal pension plan.

Stone and Hasheem (2006) regarded retirement as a prolonged departure from the labor market combined with some form of retirement income.

The pension system was not really well developed until the 20th century. His first appearance dates from a little earlier in 1873, in Germany, under what was called "old-age insurance". This allowed contributors to receive a premium during their old age according to the wages they received during the period of activity. Then, the system spread to cover the majority of countries in Western Europe.

The reason for this system was explained by German Chancellor Bismarck. According to him, "*the pension benefits granted by social security are the counterparty given by the community, the creation of wealth which it is indebted to the worker*", Devolder (2012). According to the same author, another basic model that has influenced the development of pension systems is the Beveridge model. The latter stipulates that retirement pensions must exist only to ensure adequate living conditions for individuals when they reach the age of occupational inactivity. This model is therefore based on a principle of mutual assistance trying to standardize the benefits among all pensioners, which makes it much less generous.

Initially "*guaranteeing inactive persons a subsistence was much more a gratitude than an obligation*" ISSA (1987). Traditional solidarities (family welfare, charity and saving for retirement) made it possible throughout the 19th century to take charge of old age without creating specialized institutions with the exception of government officials who benefited from pensions.

However, with the rise of wage-earners, industrial development and urbanization, institutional care will change the traditional welfare behavior Reimat (1997).

The categories first protected are civil servants and military, the earliest forms of stable and sustainable wage-earning. The State has put in place the first pension schemes for its employees and an employer rather than promoter of social protection mechanisms. France created a unified pension system, financed by PAYG, for all its officials in 1853, Great Britain in 1859 and Germany in 1872.

The Beveridge (1942) in Great Britain advocates a systematic struggle against poverty and recommended the introduction of a minimum, uniform and universal benefit voluntarily supplemented by members who then rely on private providers.

The British pension scheme is the result of this model, which will extend to the Commonwealth countries. Canada began the process in 1927. The United States adopted in 1935 a system of social protection based on access for the poorest to a minimum of protection. In Asia, the first pension system was introduced by Japan in 1942.

During the decade after World War II, countries with their own pension systems reformed it, while other countries, such as the USSR and China, only started the process of introduction. For example, the United Kingdom system, introduced in 1908, was not able to solve the problems of poverty. Beveridge (1942) pointed out several shortcomings that this pension system had and should be eliminated.

On the American continent, the example of the most radical reforms of Chile is at the same time the one most quoted in modern literature. It was the first country to establish the national pay-as-you-go pension system in 1924 and the first to eliminate it in 1980, to replace it with a funded system.

As regards the developing countries, in particular the Maghreb countries, retirement schemes have begun in the colonial context, selective and categorical at the outset, since they are reserved only for French employees. These systems subsequently extend into each of these countries (Morocco, Tunisia and Algeria) to active nationals, first civil servants and then workers, in the spheres of modern economy and public administration.

According to the classification used by Barr and Diamond (2010), there are two types of separate pension systems and a mixed or hybrid type.

The first plan is the defined benefit plan which commits to pay benefits of a predetermined amount. It is deferred income consistent with the guarantees that have been provided to pensioners in the past, according to the rules of the system and the evolution of the observed income.

In a pure defined contribution scheme, pensions are based on past contributions. Retirees' incomes depend on the circumstances in which they worked, and not on current economic conditions. Hybrid plans are systems whose benefit and contribution amounts are not defined (notional accounts).

Two modes of financing pension systems exist, and sometimes even coexist: Pay as you go and the funded scheme.

In a funded system, the employee's contributions are deposited in an individual account where he accumulates interest until he is paid thereafter according to the contribution period at the time of retirement, Only once or in periodic installments. According to Charpentier (1996) : "*It is a matter of building up a savings for the old days*".

2.2. Fundamentals and Inefficiencies of A Pay-As-You-Go Pension Plan

The pay-as-you-go pension plan is the form of management used by many pension schemes under the first pillar (Social Security schemes), Uebelmesser (2004).

The pay-as-you-go is a funding formula that consists in financing the pensions of a period by contributions paid by the active during the same period. The level of pensions depends closely on the number of active and the importance of the rates of contributions applied to wages.

Diamond and Orszag (2005) conclude that the pay-as-you-go system has two advantages: protection against inflation risk (in-service benefits are generally indexed to inflation) and protection against changes in financial markets because the risk is diversified over generations.

The pay-as-you-go, even if it makes it possible to create reserves of lesser importance, mainly supports consumption and demand and thus makes it possible to revive economic activity.

Barro (1974) argues that the pay-as-you-go system is a perfect substitute for private savings. Feldstein (1974) agrees, that private savings are decreasing because people save less since they do not need to provide for their own income at retirement. The pay-as-you-go allows (within reasonable limits that do not endanger the balance of the scheme) free validations and may grant benefits to persons who have little or no contributions (reversions).

Recent demographic developments, retirement techniques and economic analysis lead us to a deeper interest in the problem of pay-as-you-go inefficiency. The literature of history allows us to identify a multitude of arguments.

For Miles *et al.* (1999), the pay-as-you-go risks refer to long-term political factors, future demographic changes, and productivity and wages with which contributions and benefits relate.

In a pay-as-you-go system, the increase in the amount of benefits results in an imbalance that can lead to the failure of the managing body if the parameters remain unchanged. However, the State guarantees the continuity of the system, which limits the financial risk.

The pay-as-you-go remains strongly dependent on the demographic evolution and the respective weight of the active and retired, Sheshinski and Weiss (1981), Blake (2000), Lindbeck and Persson (2003). Kotlikoff (1996) insists that the main disadvantage of the PAYG system is its dependence on the size of the working population. For example, if demographic changes increase the dependency ratio (ie the ratio of pensioners per worker), the sustainability of the system requires higher individual contributions.

Pay-as-you-go is affected by policy decisions. The State can make use of the modification of parameters of the regime to ensure its durability.

Feldstein (1985) summarizes that the basic costs of the distribution principle are a lower private savings, or even a reduction in capital accumulation. This theoretical conclusion is empirically confirmed by Feldstein and Samwick (2000) who used a sample of several countries over 25 years to analyze the effects of pension systems on global saving.

From a macroeconomic point of view, the introduction of the pay-as-you-go pension system will affect the consumption behavior of two generations: that of the active and the retired.

It appears that when the decision-making horizon of the economic agent is limited to the short term, the effect of the pay-as-you-go system on savings is negative. When the economic agent binds his consumption decision to an infinite horizon based on inheritance, the pay-as-you-go system would have no effect on savings Barro (1974).

Imbricated generation models provide an adequate framework for processing the PAYG system. They are based on the life cycle assumption and thus show that the pay-as-you-go system has a negative effect on saving and economic growth when the market interest rate is higher than the system's return by the PAYG, Auerbach and Kotlikoff (1987). This negative effect persists even in endogenous growth models, Wiedmer (1996), Corsetti and Schmidt-Hebbel (1995).

Over a long period, the return on the PAYG is equal to the growth rate of the overall economy. Indeed, each generation recovers what it has placed, plus the variation of the national product between the time it contributed and the time it will receive.

At startup, a pay-as-you-go system is less costly. There are few beneficiaries and many contributors and if all the resources are distributed, the pensions can be very high without the beneficiary having contributed very long. This is one of the reasons that led to the choice of a pay-as-you-go system after the Second World War.

However, when the system matures, this PAYG advantage disappears as more and more beneficiaries share the assets' contributions.

By imagining the theoretical end of a system of distribution without any reserve, the last generation is sacrificed to the well being of all the previous generations and especially of the first generation who without having contributed has benefited from the payment of a pension.

2.3. Longitudinal and Horizontal Approach of the Redistribution

Within the framework of social protection, the question of redistribution, whatever the type of risk covered (retirement, sickness, unemployment or family) is often asked in the following way: Who loses and who wins or, more specifically, who is a net contributor and who is a net beneficiary? To answer it we distinguish two redistribution approaches :

The longitudinal approach of the redistribution leads to measuring it by means of balance sheets of contributions and benefits received by the insured over their life cycle. A zero balance is proof that the primary and secondary

distribution of income is identical. Any balance different from zero will imply a change in the primary distribution of income and therefore redistribution.

Other authors have used the concept of actuarial neutrality, which is reached when contributions and benefits are equalized in discounted values. This definition of redistribution was introduced by Coppini (1976), proposing to define redistribution as what is levied more or less than the actuarial balance of the schemes. This method is taken up by Lagarde and Worms (1978), in their article "redistribution, a new problem". It has not been contested since then and can be summarized in the words of D. Blanchet : "*An opportunity to quantify the amount of redistribution that is imposed on or received by an individual, is to refer directly to the concept of actuarial neutrality. It will be said that there is redistribution or solidarity when an individual pays to the system or receives more than what he is likely to receive* in mathematical expectation".

Horizontal redistribution involves transferring pensions for survivors. Between generations, old pensioners are disadvantaged compared to young retirees and temporary early retirement schemes create inequities. The strongest inequality is between the insured and the uninsured, insofar as pension systems cover only a minority of the elderly.

Intergenerational redistribution mainly concerns pay-as-you-go pension systems. They seek to ensure an intergenerational equity that can only be realized if each insured person receives the level of his contributions. This is a redistribution of income between insured persons of different generations. It occurs when the insureds of a generation cover the generation that has contributed to the funds that have or will be used to pay pensions.

In other words, this redistribution results from the conditions under which the financial equilibrium of pension schemes is achieved from one generation to the next.

Another way of measuring redistribution is to evaluate the inequality of primary incomes (before payment of contributions and collection of pensions) and secondary incomes (primary income plus contributions less benefits).

2.4. Contribution of A Pension Plan

Contributing, by linking paid pensions, received wages and paid contributions, is based on the principle of reciprocity according to the logic "To each according to his due". It refers to the notion of commutative justice, considering that equity is the fact that everyone receives the equivalent of his contribution. Contributory pension systems, if they are not based on a redistributive logic but on those of an equivalence between benefits and contributions, can however generate mechanisms for redistribution through different channels.

In any pension system, redistribution has the founding principle of contributing. That is a link between benefit and direct or adjusted contribution depending on the case and historical experience.

Moreover, states through their public pay-as-you-go system do not only seek equity among the layers of the population. In the name of solidarity, they organize the transfer of resources from the richest to the poorest. Contributory basic schemes are thus generally supplemented by a minimum old age to prevent those who have been unable to contribute sufficiently to fall into poverty. They then reproduce the Beveridgian principle of redistribution.

The redistribution aims at a priori to the correction of inequalities. Anti-redistributive mechanisms (which increase inequality) can also occur. Finaly, questioning redistribution can lead to a classical questioning of equity.

2.5. Equity in Pension Plans

Equity is a subjective notion that depends on the context, so it is difficult to define it. It involves a multitude of philosophical approaches, which make its implementation on pension schemes very complex.

Applied to retirement, the notion of equity is found at two levels: intergenerational fairness between generations and equity within each generation, known as intra-generational equity.

We will analyze this notion according to the temporal approaches as well as the main currents of economic thought and their translation at the level of the pension systems.

The measure of intergenerational equity is based on a comparison between generations. It can be done in two ways.

First, an instantaneous comparison of living standards will make it possible to assess the situation of the different generations present at a given moment. Individuals position themselves in relation to their fellow citizens and appreciate their standard of living in a relative way.

This criterion has the advantage of being simple of application since evaluations over time are not necessary.

Individuals also compare their evolution to that of other generations. However, the instantaneous criterion does not take into account the standard of living over the long term. It is therefore necessary to carry out a complementary study in " longitudinal section", in order to appreciate the parallelism of changes in living standards. . Generations will also compare their perceptions of the pension system with what they have paid to them in the past or will pay. This corresponds to the concept of "accounts by generation", where equity corresponds to the equality for the different cohorts of the updated balance sheets of contribution and benefit flows.

According to the economist Blanchet *et al.* (1996), the concept of intergenerational equity is then "*equality or parity of resources between age groups*" and according to this criterion would be to *"ensure a fair distribution of resources between individuals of different ages*".

Similarly, equity is defined by the principle of contributory, each perceiving the equivalent of its effort. In terms of intergenerational equity, each generation has the same return on its contributions. "*There is intergenerational equity when each generation receives as much in proportion as it has given*", Blanchet *et al.* (1996).

- Equity according to different currents of economic thought

Specialists in pension systems confirm that pensions and intergenerational equity are two concepts that are closely linked to societal choices and the economy.

- **Equity as Impartiality**

This approach characterizes equity as an impartiality between the different generations concerned. It is based on two criteria: utilitarianism and egalitarianism.

Justice between generations seen through utilitarianism, takes these values by relying not on freedom or mutual benefit but on a requirement of impartiality. The utilitarians define an equitable situation when the collective well-being is optimum.

The utilitarians do not take into account the distribution of well-being between generations, which can lead to marked differences in the treatment of cohorts in a pension system.

The egalitarian current is based not only on the requirement of impartiality, but also on equality of well-being or standard of living between generations. It can take two variants, radical egalitarianism and the maximin criterion. Radical egalitarianism advocates equality in all situations, without conditions. Blanchet *et al.* (1996) points out that there is equity between generations "*if each generation at each age benefits exactly the same living conditions as other generations at the same ages*".

However, the vision of radical egalitarianism raises the question of economic growth. Indeed, growth implies "ascending inequality" for the benefit of future generations, which is in contradiction with the vision of equity developed here. No generation should be favored to the detriment of another. In this sense, some macro-economists have shown that the search for radical equality could lead to a blocking of economic growth that is difficult to solve.

The criterion of maximum decision favors the most deprived layer. It ensures the distribution of well-being within society. Inequalities are then equitable if they are for the benefit of the poorest.

- **Equity as Freedom**

In this sense, an equitable pension scheme corresponds to an optional scheme: each generation decides its fate and has the choice of its policy of contribution for retirement.

The fundamental principle of libertarians is that of justice, which is based on the respect of freedoms. Nothing should therefore prevent freedom of exchange, as well as the right to property. They are, of course, in favor of private funded systems.

2.6. Generosity in the Context of Pension Systems

The concept of generosity is abandoning used in recent years in the literature of retirement systems. It is an indicator of comparison between schemes within the same country or between different countries. This notion is also frequently used in the implementation of reforms to restrict the supposed generosity of a pension plan. This concept can also be found in behavioral analyzes, such as early retirement.

In a broad sense, the notion of the generosity of a pension system can be at different levels. It can describe the size of the pension system, as in Cremer *et al.* (2007). In this case, a pension system is all the more generous as it is large, whatever its level of redistribution.

In addition, the notion of generosity may also refer to the level of pension benefits paid, whether it be an absolute level such as the annual pension level, for example Zaidi *et al.* (2006) or a level calculated for income earned during the period of activity as the replacement rate Hairault and Langot (2002).

In a more limited sense, the term "generosity" refers to the ability of the pension system to cover its insured policyholders without requiring contributions from them, Disney (2000).

In the same way, Brook and Whitehouse (2006) argue that generosity is then about getting too high a retreat from contributions.

3. Methodology Used

The CMR (Moroccan Pension Fund) is a public institution created by the Dahir of March 2, 1930 and endowed with legal personality and financial autonomy by Law No. 43-95 of July 4, 1996 which carried out a deep recasting of its structures.

The CMR mainly manages the civil pensions scheme established by Act No. 11-71 of 30 December 1971, which covers civil servants of the State, local government officials and employees of certain public institutions. Similarly, the CMR administers the military pension scheme established by Act No. 13-71 of 30 December 1971.

The Civil Pension Plan is a mandatory, pay-as-you-go, defined benefit annuity pension plan, which runs in annuities.

To measure internal civil regime performance, we will evaluate the indicators of redistribution, equity between and within generations, and the generosity of this regime to its beneficiaries

In order to assess the degree of generosity of our pension system, we will use a few indicators put in place by the OECD and the World Bank, which will be of particular importance for our system.

- The high level of pensions provided;
- The share of pension expenditure in GDP;
- Early retirement age;
- Favorable tax treatment;

- The number and type of beneficiaries concerned and the amount of pensions paid;
- The replacement rate, or annuity rate (Brook and Whitehouse, 2006);
- Indexation of pensions and the method of revaluation of past wages;
- Family allowances paid;
- The minimum pension for low-income seniors.

We emphasize the multiplicity of indicators used in the literature dealing with the notion of equity in a retirement system, notably generational accounting, Laurence (1992), health status, equal treatment of affiliates, etc.

In our study, we will use a number of measures of equity such as financial equilibrium, supplementary pension plans, internal rates of return, contribution periods, minimum pensions, family allowances, equal treatment of affiliates, replacement rate and recovery time.

To evaluate the contribution and redistributivity within the civil RPC system, we will analyze the internal rate of return, the liquidation base, the minimum pension and the reversion pension.

4. Results

4.1. Analysis of Inter- and Intra-Generational Equity

Measuring respect for equity within our civilian regime involves a variety of tools.

- **The Replacement Rate**

An examination of the replacement rate, which measures the difference between the pension and the wage, shows that it is deteriorating over the life of the pensioner. For the civil regime of the CMR, this initial ratio was very high, reaching 100%.

This downward trend is due to two interrelated factors.

- The wage policy pursued in the public service, which is based on an increase in wages at an irregular and categorical rate, and which is independent of changes in inflation and economic growth.
- Indexation which falls within the domain of public authorities and which is limited to one-third of the inflation rate.

In this context, old pensioners benefit from a smaller pension than young new retirees. Thus, at the CMR, a retiree of 60 years has a pension 5 times higher than that of a pensioner of 75 years or more, Dupuis *et al.* (2008)[1].

- **Inequity Due to Retirement Age**

Within the civil regime of the CMR, early departures are treated in an unfair way between members who leave work before the age limit. In order to qualify for an early old-age pension, it was necessary to work at least 21 years of service for men and 15 years for women. This may lead to measures of inequity between workers with different ages of recruitment who have the same length of service and the same wage.

Hence the requirement of a minimum age for early retirement (55 years for example) as for other countries (55 in France) can reduce these inequalities between retirees.

In the event of early retirement, the CMR treats all pensioners in the same way regardless of their age at retirement. Thus, it will apply an annuity rate of 2% instead of 2.5%, so it penalizes those who retire at an age greater than 55 years in favor of those who leave before.

However, introducing an annual malus over the remaining time to reach the legal retirement age will minimize spending and ensure equity between younger and longer-term pensioners. For example, a reduction in the annuity rate of 0.25% over the remaining 5 years to reach the legal retirement age. Similarly, an inequity is found between the sexes of men and women regarding the age of early retirement. For the age of eligibility, there is equivalence between the two sexes.

It should be noted that men earn on average 25% more than women in working life and 72% more than women in retirement.

In 2004, Morocco set up a voluntary departure program for civil servants in order to reduce the number of employees in the public sector.This program has encouraged 30 000 civil servants, half of them executives, to benefit from this advantageous mechanism, which also creates disparity and inequity between generations, but in a very temporary way.

- **Internal Rate of Return (IRR) and Recovery Time**

In a pay-as-you-go pension system such as the CMR, there is a maximum rate of return that can be paid to affiliates. Generally, these rates of return above the long-term growth rate of the economy are unsustainable.

In the case of civil pension plans, implicit or actuarial rates of return (IRR) tend to vary widely depending on the affiliate's age and salary history.

[1] This gap is also due to the implementation of the voluntary separation program, which has led high-income civil servants to early retire.

The actuarial rate of return and the recovery time are constant whatever the wages of the individuals, so they do not depend on the level of wage when the demographic characteristics (age, duration of contribution and life expectancy) are identical for the individuals of the scheme of retirement, Chaoui (2009).

Similarly, the actuarial rate of return is inversely proportional to the contribution period, that is, when the contribution period is longer, the rate of return becomes lower and vice versa. Therefore, the value of the IRR depends essentially on the contribution period, Chaoui (2009).

- **The Contribution Period**

The retirement pension in the civil regime of the CMR is calculated on the basis of the last salary subject to contribution. This measure may create inequalities among members of the scheme. Thus, the CMR does not establish a correlation between the contribution effort provided and the benefit awarded. This favors "last minute promotions" and introduces some inequity between affiliates with different career profiles but arriving at retirement age with the same level of pay.

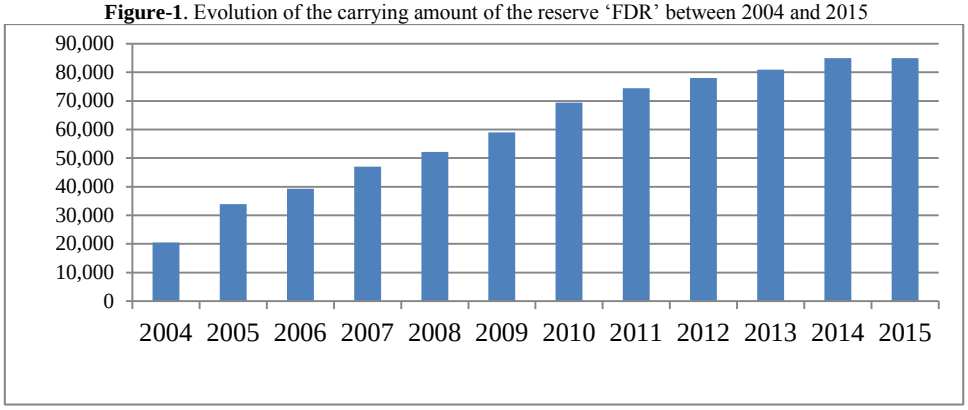
However, in the calculation of the pension, the civil regime of the CMR takes into account only the contribution period, the retirement age and the end-of-career salary, without taking into account the amount of contributions of its affiliates. If the civil regime chooses a career-wide average wage in the calculation of the pension, this will introduce some degree of equity between the affiliates but, on the other hand, will reduce the levels of pensions provided.

Thus, if the civil regime of the CMR introduces the average of the last eight wages into the calculation of the pension, it will serve lower but equitable pension levels.

- **Financial Equilibrium**

In order to ensure its provisional financial equilibrium (an important factor in maintaining equity), the CMR civil regime set up a reserve fund generating significant resources (the 1996 reform). The depth of this reserve confers on the civil regime a positioning of "Market Maker" on the Moroccan financial market.

Figure-1. Evolution of the carrying amount of the reserve 'FDR' between 2004 and 2015



On the other hand, civilian control mechanisms are inadequate. In fact, this CMR civil pension scheme, which operates according to the method of distribution, is adjusted according to the staggered premium technique. According to the legal framework governing this scheme, this mechanism is activated when the amount of the pension reserve decreases until it reaches the equivalent of twice the average of the expenditure recorded during the last three financial years. At that time, the employee and employer contribution rates must be adjusted in such a way as to guarantee a balance over a minimum period of 10 years and a surplus that can be used to finance the corresponding provision. This will have a negative impact on CMR's civil regime equity based on the principle of utility. The following formula reflects the principle of the staggered premium:

$$Reserves\ (n) \geq 2 \times \left(\frac{\text{expenditure}\ (n) + \text{expenditure}\ (n-1) + \ \text{expenditure}\ (n-2)}{3} \right)$$

- **The Voluntary Scheme**

Since 2005, the pension's fund has been managing a supplementary pension scheme based on the individual capitalization principle called "Attakmili" for civil and military affiliates. Membership is in the form of a flat-rate contribution starting at 50 DH or a percentage of the gross salary. Through the establishment of an optional 'Attakmili' retirement, the civil regime of the CMR ensures a level of equity between its affiliates and its pensioners according to the principle of freedom.

At the end of 2015, the number of affiliates of the supplementary scheme 'Attakmili' reached 2309, (of which 154 new affiliations), an increase of 7.15% compared to the year 2014. The number of members of the voluntary scheme 'Attakmili' has recorded since its creation in 2006, an average annual increase of 24%.

At the end of 2015, the net book value of reserves 'Attakmili' amounted to 82.3 million Dhs net of provisions, representing an increase of 24.37% compared to 2014. This amount was financed by the net contribution flows for the year and the financial income generated by the plan portfolio (8.2 MDhs).

- **Minimum Pension**

The retirement system is far from being considered an optimal system from the perspective of the community as a whole. Certainly the CMR introduced the principle of the minimum pension which can not be less than 1000 DH. But it remains too small and does not reach a minimum acceptable for the former contributors and still less for the rightful claimants.

4.2. Generosity of the Civil Pensions System

According to the actuarial balance sheets at the end of 2015, the probable present value of the benefits is 1,129.77 billion Dhs. The probable present value of the resources, on the other hand, amounts to 178.16 billion Dhs.

The net unhedged commitment therefore stands at -866.39 billion Dhs. It corresponds to the difference between the Current Probable Value of the resources, to which is added the contingency reserve which reached 85.21 billion Dhs, at the end of 2015, and the Probable Current Value of the benefits. This is mainly due to the 'generosity' of the CMR's civil regime, manifested in several indicators ranging from high annuity rates to more favorable liquidation conditions.

- **Benefits Paid**

The number of beneficiaries in 2015 is 313195, including 223214 main pensions, compared to 291691 in 2014.

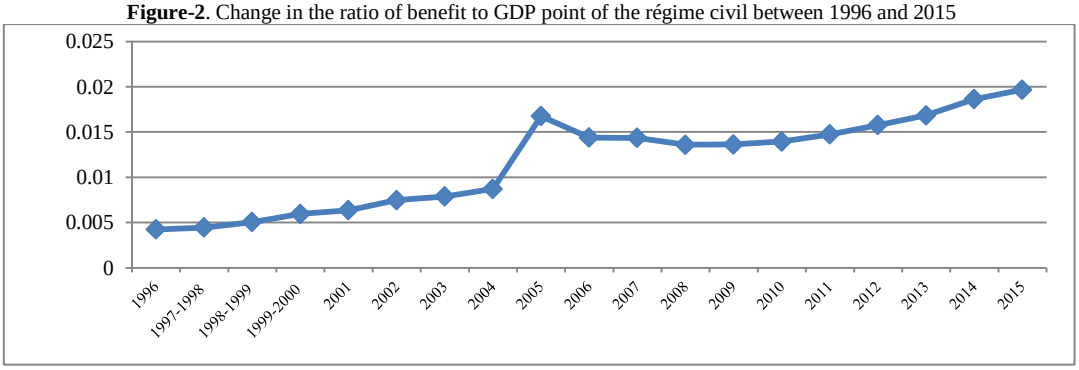
The age pyramid shows their concentration in the 60 to 64 age group with an average age of 66,19 years (63,45 years for women and 67,22 years for men). The modal class is the age group [60 years - 65 years] which comprises 40,29% of the total number of pensioners. The scheme has 25 centenaries (beneficiaries of the main pension), the oldest being 104 years old.

In this sense, spending on the civil pensions system amounted to 18 556,19 MDhs in 2015 against 16 815,04 MDhs in 2014, registering an increase of 10,35%. The average monthly pension is:

- 6,482.78 Dhs (Gross amounts) of (all retirees)
- 8,960.45 Dhs (gross amounts) (for retirees 2015)

This increase is mainly due to the new pension revisions, which will reinforce the plan's generosity.

Figure-2. Change in the ratio of benefit to GDP point of the régime civil between 1996 and 2015



- **The Replacement Rate**

The civil pension system is characterized by an excessive generosity of benefits compared to the contribution effort made.

It offers its members a 2.5% entitlement of the last salary for any year of contribution, i.e a replacement rate of up to 100% of the last salary where, for a career of 40 years, an affiliate can to retire with a pension equivalent to his last salary[2].

The average civil replacement rate in 2015 is 85%, which is very high by international standards. For Algeria, the replacement rate is 80% for 32 years of contribution and in Tunisia, this rate is 90% for a contribution period of 40 years.

- **Under-Pricing**

Constitutes an important element of regime generosity. Indeed, the tariff of the acquisition of the rights is 20% for the civil pension plan of the CMR.

The Court of Auditors estimated that against one dirham contributed 1.99 dirham is disbursed. This rate remains low compared to world standards. For example, 28.3% in Spain and 26% in Greece.

- **The Minimum Pension**

The fixing of a minimum pension and its revaluation to 600 DH in July 2008 and to 1000 DH per month in May 2011, is a social concern that is borne by the civil regime alone, which illustrates the generous nature of the civil pension plan of the CMR.

[2] The generosity is also explained by the importance of the annuity rates in Morocco. (The annuity rate is high 2% for the CNSS, 2.5% for the CMR and 2% for the RCAR whereas in France this rate is limited to 1.33%).

In 2015, the minimum pension benefits 24 064 people, including 15 572 survivors' pensions, 30 centenaries (beneficiaries of the reversion pension), the oldest being 107 years old.

- **The Tax Abatement**

The increase in the tax abatement to 55% (Financial Law 115-12 of 2013) on pension had a negative impact on the State's tax revenues in income. This change appears to be unjustifiable, it benefits only a small minority of pensioners with high incomes.

Although it appears to be neutral for the regime, this type of measure has a negative indirect impact on the behavior of the affiliates towards the accession or not to certain measures envisaged in the framework of the parametric reform like the voluntary prolongation of the age of retirement. Indeed, with a 55% tax deduction on pension, some affiliates may decide to retire early and at the same time benefit from a high replacement rate, which in turn will ultimately have a negative impact on the pension balanced of regimes.

The increase in the abatement has the effect of reducing the period of activity and contribution required. This can be achieved in the case of CMR between the ages of 30 and 34 depending on the level of remuneration that is well below the 40 years of activity required to reach the plan ceiling.

- **Liquidation Conditions**

The payment of pensions is made on the basis of the last salary and not of an average salary in the whole career or part of the career, which will make it possible to serve pensions high and uncorrelated with the level of contributions made. This situation further aggravates the imbalance of the system, especially with the tendency to promote advancement of rank in the public administration.

On the other hand, it should be noted that the wage increase of the population affiliated to the plan is greater (about 4,5% on average) compared to other pension plans (RCAR and CNSS in this case).

Moreover, the non-capping of the plan's contribution base has the effect of further accentuating the plan's future commitments whenever the public service has a significant salary increase, since the latter is directly taken into account in the contribution and especially in the liquidation of pensions.

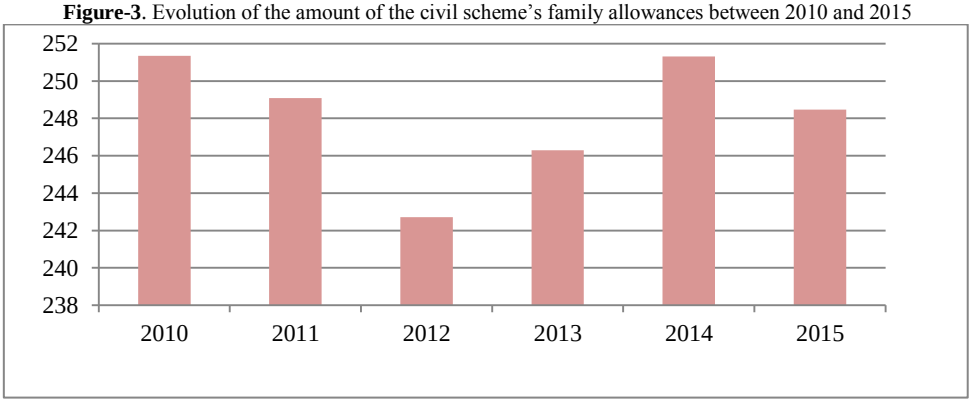
- **Actuarial Non-Neutrality**

The current rules provide for the possibility of early retirement. The right to retirement is then acquired immediately and not at the legal age of retirement (60 years), with an annual reduction of 2.5% to 2% which does not reflect the real cost of retirement scheme.

- **Family Allowances**

These are not individualized, either on the level of the contribution or at the level of a dedicated reserve fund. They are thus paid by the regime and come to increase its burdens and strengthen its generous character.

Figure-3. Evolution of the amount of the civil scheme's family allowances between 2010 and 2015



- **The Actuarial Rate of Return and the Recovery Time**

In order to assess the degree of generosity of our pension plan by matching contributions and benefits, the universally accepted method should be used, based on the calculation of an actuarial rate of return and, on the other hand, recovery time.

The actuarial rate of return is the discount rate that matches the benefits received and the contributions paid.

$$\sum_{active\ life} \frac{\tau_t \times S_t}{(1+TRI)^t} = \sum_{retirement} \frac{P_t}{(1+TRI)^t} \qquad (1)$$

- TRI: The discount rate
- S_t: The calculation basis
- τ_t: The contribution rate
- P_t: Retirement pension

Thus, we refer to the measure of the recovery time which measures the period during which the pensioner has consumed all the contributions paid during his working life :

$$d = \frac{\sum_{active\ life} C_t}{p} \qquad (2)$$

This delay determines the degree of system generosity.

In this context, we illustrate the generosity of the civil pensions system, taking an example of a typical individual who has an annual salary of S = 120 000 Dh, starting his career at 25 and retiring at 60 year.

Table-1. Calculation of Internal Rate of Return and Recovery Time

Contributions paid	Pensions paid	Gap	Internal Rate of Return	Recovery Time
3 873 657	4 276 516	-402 859, 4	4,82%	13,90

Clearly, these rates are particularly high in comparison with rates of return on investment, returns on financial markets and the level of growth of the national economy (World Bank).

In 2015, the economy's growth rate is only 4.55%. Similarly, the market placement rate is 4.6%, while the civil pensions plan pays benefits in the amount of contributions must be placed at 4.82% to honor its commitments.

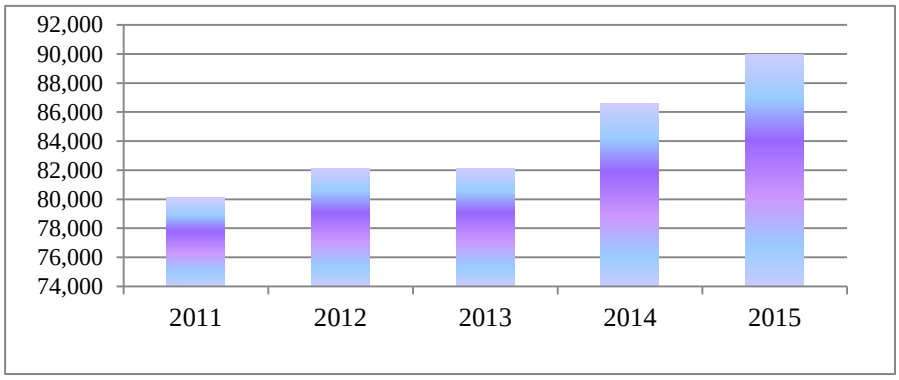
In addition, the Recovery Time is only 13,90, that is to say, the retiree after almost 14 years consumes all the contributions paid and with an average life expectancy at age 60 of 21 years (estimated by the CMR in 2015), the scheme provides him with 7 years of benefits on which he has not contributed.

In the case of our scheme, retirees tend to benefit from the system insofar as it offers rates of return that are above sustainable levels.

- **Recipients**

The number of the beneficiaries of reversion pension of the civil regime has increased from 2014 to 2015 by around 3,92%.

Figure-4. Evolution of the civil regime's beneficiaries of reversion pension between 2010 and 2015



Reversion pensions are provided mainly to widows, ie 84,07% of the total number of people who reached 89.981 in 2015. The remaining 15,93% represents the number of dependent children receiving an orphan's pension and a family allowance, ie 14.474 orphans and widowers who represent 1,48% of the total.

The average age of the spouses (female majority) is 65,48 years. The centenarians are 30 widows of whom one aged 107 years.

Admittedly, pensions paid to survivors are much lower than those of direct law, which reduces their impact on the total expenditure of the scheme.

4.3. Measuring Redistribution and Contribution

- **Internal Rate of Return**

For members with the same contribution earnings, the civil scheme pays higher rates of return to those who contribute for a short period, i.e those who contribute less, which is unfair.

We then characterize the redistribution between two categories of individuals by an inequality of their internal rate of return. Nevertheless, the internal rate of return is a relatively complex indicator to interpret and may appear insufficient in some cases.

First, the internal rate of return apprehends redistribution regardless of the level of benefits. It can thus assume the same value in a system with high contributions and benefits as in a system with low contributions and benefits : the IRR (internal rate of return) is independent of the contributing effort and the resulting benefit. A beneficiary of the contributory minimum may have a very high IRR. Similarly, insured persons with a high internal rate of return, following the implementation of a non-contributory mechanism, are indeed likely to benefit from a redistribution induced by the pension system.

Secondly, the internal rate of return indicates the direction of redistribution but does not measure its extent. The analysis of TRI allows us to conclude on the meaning of redistribution. This analysis can be done on the basis of income : if the internal rate of return decreases with income, the pension system is redistributive in the sense that it generates transfers for the benefit of low wages. Conversely, increasing rates with wages would be proof of an anti-redistributive system favorable to the most comfortable layers of the population. Finally, the internal rate of return

may lead to erroneous conclusions about the direction of redistribution in the case of the application of a progressive scale[3].

According to Robalino (2005), "*in all pension systems, there are implicit transfers from younger workers to older workers, regardless of the level of income, because the implicit rates of return on contributions vary according to the age at which a person becomes a member of the system ".*

- **Liquidation Base**

The civil regime of the CMR retains the last year for the calculation of rights. The retirement does not represent career but only career end. These modes of calculating retirement can have redistributive effects in favor of those with a large increase in final salary.

- **Minimum Pension**

In most countries where social security is based on a commutative view, there is a desire to supplement professionals schemes by providing services to guarantee a minimum basic level. More than the minimum is low, the strongest are the redistributive effects. Thus the civil system ensures a redistribution since there are pension minima.

- **Reversionary Pension**

The pension scheme for survivors leads to a significant horizontal redistribution, triggered by the death of the holder of the direct pension. Indeed, the number of surviving spouses and orphans receiving a pension appears to be very high and has risen sharply over the last 10 years.

5. Conclusion

In conclusion, we assessed CMR's internal civil regime performance by analyzing and measuring its performance indicators including generosity, contributability, redistribution and inter- and intra-generational equity. In this sense, we have given, by way of example, concrete cases whose criteria are not concretely taken into consideration.

As a result, it is interesting to note that the evolution of the CMR system over the long term reflects a doubtful picture of the future of pensions, which may call into question the application of these equity criteria and redistribution.

Intergenerational equity in retirement is closely linked to the objective of financial sustainability of the pension system since, on the one hand, the latter is a condition for the maintenance of intergenerational equity and that, on the other hand, measures to adjust the parameters of the pension system aiming at ensuring this perpetuity have consequences for the situation of the different generations.

In order to maintain intergenerational equity and improve the level of redistribution, the civilian pension system must be regularly assessed and monitored through a transparent evaluation process, based on realistic assumptions, and whose results must be quickly and clearly communicated to the various stakeholders.

The implementation of this process of explicit monitoring of the mechanisms of redistribution and intra- and intergenerational equity would have important advantages. First, maintaining pension schemes with risk pooling favors better retirement planning, optimal financing and ultimately better social protection.

Similarly, debates on redistribution, equity and intergenerational viability can not be limited to the regime alone. They must be discussed at a broader level, encompassing spending on education and health, taxation, national debt transmitted to future generations. To ask the question in these terms broadens the concept of intergenerational justice, so that all generations are treated equally by society.

And finally, in order to control generosity and ensure intergenerational equity, the civil regime will have to initially implement a reform based on the modification of its parameters and then draw inspiration from a model of the notional accounts that builds on intergenerational reciprocity.

Reference

Auerbach and Kotlikoff (1987). *Dynamic fiscal policy.* Cambridge University Press: Cambridge.

Barr and Diamond (2010). *Pension reform a short guide.* Oxford University Press: Oxford. 264.

Barro, R. J. (1974). Are government bonds net wealth? *Journal of Political Economy*, 82(6): 1095-117.

Beveridge, W. (1942). *Social insurance and allied services report.* The Macmillan Company: NY. 299.

Blake, D. (2000). Does it matter what type of pension scheme you have? *The Economic Journal*, 110(461): F46-F81.

Blanchet, D., Brousse, C. and Okba, M. (1996). Retirement, early retirement, actuarial neutrality and coverage of the risk of unemployment at the end of a career. *Economie et Statistique*: 291-92.

[3] The internal rate of return is only an indicator of return on investment. It does not take into account the weight of the insured's contribution. Thus, because of the progressive scale, the wealthiest insured persons contribute proportionally to their wages far more than insured persons at the bottom of the wage scale. And even if the return on their retirement is lower, they compensate for this lack by an over-taxation overcost in a system that remains favorable and allows them to stay on the income scale. The generosity of the pension system associated with a high contribution rate for high wages thus makes it possible not to modify the distribution of income, although the return on contribution (or IRR) of high wages is lower than the return on contributions of low salaries.

Brook, A. and Whitehouse, E. (2006). The Turkish Pension System: Further Reforms to Help Solve the Informality Problem. OECD Economics Department Working Papers, No. 529, OECD Publishing.
Chaoui, A. (2009). Contribution to the analysis of the sustainability of pension systems: from challenges to strategies: Case of the Moroccan Pension Fund. Doctoral thesis, Mohammed V Souissi -Rabat University.
Charpentier, F. (1996). Pension Funds. Ed. Economica. 110.
Coppini, A. C. F. (1976). Practices in the form of ethnographic museum. *Ca 'Foscari University of Venice*: Available: http://dspace.unive.it/handle/10579/5836
Corsetti and Schmidt-Hebbel (1995). Pension Reform and Growth. World Bank Policy Research Working Paper No. 1471
Cremer, H., De Donder, P., Maldonado, D. and Pestieau, P. (2007). Voting over type and generosity of a pension system when some individuals are myopic. *Journal of Public Economics*, 91(10): 2041-61.
Devolder, P. (2012). Pension Funding : illusions and hopes. Luxembourg Bulletin Social.
Diamond, P. and Orszag, P. (2005). *Saving social security.* Brookings Institution Press.
Disney, R. (2000). Crises in public pension programmes in OECD: What are the reform options. *Economic Journal*, 110(461): F1-F23.
Dupuis, J.-M., El Moudden, C. and Pétron, A. (2008). Retirement systems in the Maghreb: an initial analysis, CREM, University of Caen Basse-Normandie.
Feldstein (1974). Social security, induced retirement, and aggregate capital accumulation. *Journal of Political Economy*, 82(5): 905-26.
Feldstein (1985). Debt and taxes in the theory of public finance. *Journal of Public Economics*, 28(2): 233-45.
Feldstein and Samwick (2000). The Transition to Investment-based Social Security when Portfolio Returns and Capital Profitability are Uncertain. NBER Working Paper No. 7016.
Gustman and Steinmeier (1984). Modeling the retirement process for policy evaluation and research. *Monthly Labor Review*, 107(7): 26-33.
Gustman and Steinmeier (1999). Effects of pension on savings : Analysis with data from the health and retirement study. *Carnegie-Rochester Conference Series on Public Policy*, 50(1): 271–324.
Hairault, J.-O. and Langot, F. (2002). The more egalitarian nature of pay-as-you-go retirement. A cause heard? *Journal of Political Economy*, 112(4): 563-72.
Honig, M. and Hanoch, G. (1985). Partial retirement a separate mode of retirement behaviour. *Journal of Human Resources*, 20(1): 21-46.
Kotlikoff, L. J. (1996). Privatization of social security: How it works and why it matters. *Tax Policy and the Economy*, 10(1): 1-32.
Lagarde, F. and Worms, G. (1978). Redistribution, a new problem. *Statistics and Financial Studies*, 32: 54-74.
Laurence, K. J. (1992). *Generational accounting ; knowing who pays, and when, for what we spend.* The Free Press.
Lindbeck and Persson (2003). The gains from pension reform. *Journal of Economic Literature*, 41(1): 74-112.
Miles, D., Timmermann, A., Haan, J. d. and Pagano, M. (1999). Risk sharing and transition costs in the reform of pension systems in Europe. *Economic Policy*, 14(29): 252-86.
Reimat, A. (1997). *Pensions and the economy. An historical perspective, 19th-20th centuries.* Harmattan, Economic Logics Collection: Paris. 323.
Robalino, D. (2005). Pensions in Middle East and North Africa: time for change. The World Bank, coll Orientations in development series, Washington DC.
Ruhm, C. (1990). Bridge jobs and partial retirement. *Journal of Labor Economics*, 8(4): 482-501.
Sheshinski and Weiss (1981). *Uncertainty and optimal social security systems.* Oxford University Press: Oxford. 189-206.
Smeeding, T. M. and Quinn, J. F. (1997). Cross-national patterns of labor force withdrawal. LIS working paper no. 170. Luxembourg Income Study, from officially entitled Social Insurance and Allied Services.
Stone, L. O. (2003). Sociodemographic changes and aging populations. *Association of Demographers of Quebec*, 32(1): 155-65.
Stone, L. O. and Hasheem, N. (2006). *The distinctive patterns of work-to-retirement transition among the self-employed. New Frontiers of Research on Retirement.* Minister of Industry: Ottawa. 1.
Uebelmesser (2004). Harmonisation of old-age security within the European Union. *CES Economic Studies, CESifo*, 50(4): 717-43.
Wiedmer, T. (1996). Growth and social security. *Journal of Institutional and Theoretical Economics*, 152(3): 531-39.
Zaidi, A., Grech, A. and Fuchs, M. (2006). Pension Policy in EU25 and its Possible Impact on Elderly Poverty. Centre for Analysis of Social Exclusion, Working paper, No. 116, December.

Web Sources

http://www.finances.gov.ma
http://www.HCP.ma
http://www.un.org/fr
http://www.cmr.gov.ma