

CAN PENSION FUNDS NUDGE A SUSTAINABLE DEVELOPMENT?

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ABSTRACT

Sustainable energy sources and clean technologies can be financed through various types of financial investments, supported mainly by institutional investors, as well as by governments and other public entities. Institutional investors, according to the specific management mandate and the fiduciary relationship with shareholders, can participate in these projects through equity investments (including mutual funds and ETFs), bonds (both corporate and government ones, with specific reference to green bonds) and alternative funds (such as direct investments through private equity or green infrastructure funds). Among institutional investors, pension funds have risk-adjusted return objectives and valuation time horizons that are particularly consistent with sustainable and responsible investments (SRI). Indeed, SRI integrate the financial analysis with the environmental, social and good governance (ESG) analysis, have a medium-long term orientation and the aim of creating value for the investor and the society as a whole. The introduction of new regulatory requirements on sustainable finance, as well as a growing attention to sustainability by savers and employees, also push pension funds to incorporate the ESG approach as an integral part of their investment process.

However, the uptake of pension funds specializing in green and sustainable investments is still limited in practice. The research, in addition to identify the possible causes, provide some strategic management guidelines useful to pension fund managers for the selection of financial portfolios by taking into account ESG factors, within the context of the various investment lines that characterize a pension fund.

The asset allocation of a pension fund must guarantee the achievement of the so-called actuarial balance: the disinvestment over time of the securities included in the portfolio must be able to generate inflows that are consistent, in amount and timing, with the needs for benefits' payment to shareholders, taking into account the specific characteristics of the population covered by the fund.

This research aims to provide answers to the following research questions: Does the gradual replacement of securities selected by applying ESG criteria to not-ESG-screened securities allow the pension fund to maintain the actuarial balance of the various investment lines of a pension fund? Is it possible to build financial portfolios fully selected by applying ESG criteria while maintaining the actuarial balance determined for a not-ESG-screened portfolio?

The analysis is conducted through the development of business cases, the application of actuarial balance models, as well as sensitivity tests through the application of passive strategies with respect to different ESG benchmarks, up to the complete replacement of the original not-ESG benchmark.

The balance between income (for contributions) and expenses (for benefits) can be variously defined in a supplementary pension scheme. It can be considered a collective balance, or an individual balance. In our paper, an individual balance is considered. Moreover, the equilibrium can be actuarial and financial. If we consider the whole remaining lifetime of the policyholder (initially at work, later possibly retired), the individual balance between contributions and benefits is therefore of a mixed type (partly financial, partly actuarial) and operates in the following way:

- in the initial period of activity of the insured person (therefore, in the period of payment of contributions), the balance is of a financial nature;
- in the subsequent period of retirement of the insured (therefore, in the period of disbursement of the annuity), the balance is actuarial.

Considering the time of retirement and the fixed annual term of the life annuity, the principle of individual actuarial balance establishes that, for each insured in the fund, in any instant k of the period of activity, the sum of the current expected value of the future contributions, and the reserve equals the expected present value of the corresponding benefits.

We assume that the life annuity is financed through the payment of annual constant premiums for the entire duration of the deferral of the annuity. The premium depends on the initial age (x) of the policyholders (male or female) and the duration (n years) of the deferral annuity after retirement.

For the correct calibration of the investment portfolios and the application of actuarial methodologies, a proprietary and confidential panel dataset was collected on the whole population of subscribers of the different business lines of an Italian open pension fund, proposed by an insurance intermediary.

The performance of sustainable investments is tested by analyzing the pension investment choices of 1,496 members from January 2014 to December 2018, for a total of 6,083 year-individual observations. The main variables used to describe the participants' investment behavior and socio-demographic characteristics are: individual contribution, company contribution, total contribution, contributory uppercut, investment line, switch and advance behaviour, gender, age, home region, educational qualification, sector of activity/work, marital status.

The results contribute to the literature on sustainability and decarbonisation of institutional investors' portfolios, providing useful implications to both the regulator and the asset managers of pension funds.

Keywords: *sustainable development, sustainable finance, decarbonization, pension funds, actuarial equilibrium*