



## **“The Plan Sponsor’s Goal” Revisited**

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## The Comeback of “The Plan Sponsor’s Goal”

The September-October 2008 issue of the *Financial Analyst Journal* (*FAJ*) contains two short letters regarding an article the *FAJ* published in 1995. The first letter, written by C. Kerwin, argued that the abstract of the article “*must have been written in error by someone at the FAJ.*” In the second letter, R. Ennis, the editor of the *FAJ*, agreed with Mr. Kerwin, surmising that “*then-editors either added the abstract or modified its wording.*”<sup>1</sup>

To say that these letters are highly unusual would be an understatement. Setting aside the merits of these letters, the fact that the *FAJ* decided “*to correct a seemingly minor error appearing in an article published more than 10 years ago*” is simply astonishing. Why would a “seemingly minor” alleged inconsistency between the abstract and the body of the article necessitate a correction more than thirteen years after the publication? The article must be truly special.

And truly special it certainly is. The article – entitled “The Plan Sponsor’s Goal” – is one of the last papers written by Fischer Black, a prominent economist and, among other achievements, one of the founding fathers of financial engineering.<sup>2</sup> The article was Dr. Black’s final message to pension practitioners, as he passed away soon after the publication of the article.

While Dr. Black’s involvement in the pension field is not as well-known as the famous Black-Scholes formula, many pension practitioners are well-aware of Dr. Black’s contributions to the field. In particular, Dr. Black’s “The Tax Consequences of Long-Run Pension Policy,” published in the *FAJ* in 1980, has been especially popular among the proponents of “financial economics” (a.k.a. “corporate pension finance”), having been quoted in a number of publications in recent years.<sup>3</sup>

“The Plan Sponsor’s Goal” has not been so fortunate. Few, if any, proponents of “financial economics” have discussed this article, apparently sensing that the paper goes far beyond “financial economics.” While Dr. Black’s views circa 1980 have been extolled in a number of publications, virtually all of these publications have ignored his views circa 1995. Yet, remarkably, the article reemerged in the *FAJ* in 2008, and the editor – a high-profile proponent of “financial economics” – called this correction an “important matter.”

To those of us who have argued that “The Plan Sponsor’s Goal” has not received the attention it deserves, this comeback is long overdue. The article contains several important ideas that should be discussed in light of current developments. At the same time, the article is controversial and, at times, inconsistent; its language is not perfectly clear and requires a certain level of guessing. A comprehensive discussion of the article is certainly in order.

This paper is an attempt to jump-start a discussion about “The Plan Sponsor’s Goal.” The views presented in this paper represent this author’s understanding of the matters discussed in the article. Unavoidably, this paper contains a certain amount of guesswork, as this author does not possess any non-public information about Dr. Black’s thinking at the time. To facilitate the discussion, the major conjectures are clearly identified.

### **From Tax Arbitrage to ...**

Tellingly, “The Plan Sponsor’s Goal” starts with questions and ends with a question.

*“How should defined benefit pension plan sponsors choose an investment strategy for their pension funds? How should they allocate the assets in their funds among broad asset classes such as stocks, bonds, and real estate? How should they diversify within and across asset classes?”*

The presence of these questions is a surprise because Dr. Black seemed to have answered them in Black [1980]. His answer was perfectly clear: pension assets should be invested in entirely in bonds or bond-like assets, due to, among other things, the existence of a “tax arbitrage.” So, why were “*stocks and real estate*” under consideration in 1995 if Dr. Black effectively ruled them out in 1980? Apparently, Dr. Black’s views had evolved somehow between 1980 and 1995. What happened?

Having presented seemingly solid reasons for investing pension assets exclusively in bonds, Dr. Black may have been surprised to observe that few (if any) plan sponsors had followed his suggestion. Moreover, the apparent trend among pension plans was actually to increase their non-bond allocations, contrary to what Dr. Black recommended. Corporations are not known for their reluctance to use legitimate ways to reduce their taxes, so Dr. Black may have been wondering why his recommendation was largely ignored.

Dr. Black’s thinking in this direction may have compelled him to view the matters of asset allocation for pension plans from a different angle. While the return of “stocks and real estate” in Black [1995] was a surprise, it was not a complete surprise. Dr. Black’s views circa 1989 were already moving away from his position in 1980 (see Black [1989]).

According to Black [1989], a pension plan’s “best mix” depends on the plan’s view of the pension liability. Specifically, Dr. Black defined two distinct types of “liabilities” - “the narrow liability” and “the broad liability.” “The narrow liability” is defined as a termination-like liability - “... the liability you have if all your employees quit and you decide not to replace them.” “The

broad liability” is defined as “the present value of all benefits paid by the plan. ... It counts benefits paid to current and past employees and all future employees, too.”

A pension plan for which the narrow liability is the most appropriate measurement should be invested in fixed income assets. A pension plan for which the broad liability is the most appropriate measurement should be largely invested in equities. Namely,

*“The best mix will depend on your view of the liability. To hedge the narrow liability, you will use fixed income securities only. To hedge the broad liability, you will want a large proportion of stocks.”<sup>4</sup>*

Dr. Black considered also “other definitions of the pension liability that fall between the narrow liability and the broad liability.” The best mix for a pension plan for which certain “intermediate” liability is the most appropriate measurement would “fall between” all-bond and all-equity allocations.

Yet, Black [1989] is still far away from Black [1995]. In Black [1989], Dr. Black did not present a quantitative methodology to generate efficient portfolios and, therefore, fell short of the hallmarks of financial economics – rigorous quantitative models with extensive practical applications. The principle “the best mix will depend on your view of the liability” is simply too imprecise. It is unclear how the plan sponsor’s “view of the liability” is related to the plan sponsor’s goals. Further, Dr. Black appeared to believe that the pension liability “will behave like a security,” a view that has an uncertain foundation. Unsurprisingly, this view did not find its way into Black [1995].

Why would a conventional plan sponsor snub the “tax arbitrage” idea? Dr. Black did not answer this question in Black [1989]. Yet, the answer to this question may have been the key to understanding the origins of “The Plan Sponsor’s Goal.”

*Conjecture 1.* Dr. Black may have thought that a conventional plan sponsor did not accept the “tax arbitrage” idea because taking advantage of the “tax arbitrage” was not one of the plan sponsor’s goals in investing pension assets.

If this is the case, then what is the plan sponsor’s goal? Dr. Black may have written “The Plan Sponsor’s Goal” as an attempt to answer this question.

Dr. Black acknowledges that “we can imagine many answers to our investment policy questions.” He presents a concise summary of common approaches to the development of investment policy. Specifically, Dr. Black brings up the following three objectives.

1. To maximize expected return subject to limits on the amounts invested in specific asset classes.
2. To maximize expected return on the pension fund assets subject to a given risk of the assets.
3. To maximize expected return for given risk relative to their liabilities.

Note that Dr. Black does not mention “to take advantage of the tax arbitrage” among these objectives (or anywhere else in the article).

Similar to Black [1989], Black [1995] also briefly discusses “narrowly or broadly” defined liabilities – from the “narrowest” (“all participants retired today”) to the “broadest” (“all the benefits the plan will pay out in the future including benefits to future employees”). However, these liabilities no longer determine “the best mix.” Having listed the aforementioned three objectives, Dr. Black makes the following remarkable statement.

*“All these points of view lead to different answers to our investment policy questions. All of them seem legitimate. Still, my view of the pension plan suggests an approach that differs from all of these. ...*

*I question the usual formulation of the plan sponsor’s goals.”*

At the end of the article, Dr. Black delivers his main message.

*“Thus, how we set up the goals of a pension plan sponsor matters a lot. Maximizing expected return for given risk gives one set of strategies, and maximizing present value gives another.*

*Which goal makes the most sense to you?”*

### **... Present Values**

It should be mentioned that the expected return-based objectives that Dr. Black mentioned are based on the optimization of future values. Given \$1 at the present, the maximization of the expected (surplus) return means the maximization of the *future value* of this \$1 under certain constraints. Dr. Black’s approach “differs from all of these” – he suggests that the optimization of a *present value* is “better.”

Essentially, Dr. Black wants to “reverse” the expected return based objectives and utilize “the *present value* criterion” that “summarizes all cash flows from a project.” Unfortunately, Dr.

Black is not perfectly clear about what kind of present value criterion he proposes to use and how to use it. In the abstract, he suggests that

*“... a plan sponsor may want to choose an investment strategy to minimize the present value of future contributions to the plan.”*

In the body of the article, Dr. Black suggests that a plan sponsor may want to choose an investment strategy to maximize the present value of the sponsoring corporation. Dr. Black makes no effort to reconcile these suggestions in the article. Apparently, the connection between the minimization of the present value of future contributions and the maximization of the present value of the corporation was so obvious to Dr. Black that he saw no need to elaborate about this matter. Here is how Dr. Black may have envisioned this connection.

*Conjecture 2.* The value of a corporation is equal to the present value of future revenues minus the present value of future costs. Therefore, as far as the pension plan’s impact on the value of the corporation is concerned, the plan sponsor should *minimize* the present value of future contributions (given the terms of the plan) in order to *maximize* the present value of the corporation.

In other words, lower labor cost implies higher value of the corporation. The article and the abstract are consistent in that respect.

It is important to note that the objective of minimizing “the present value of future contributions to the plan” and the view that the present value of future contributions “will behave like a security” are essentially incompatible. A security tradable in a deep and liquid market has a current price that cannot be minimized – it is what it is at this instant.

Dr. Black provides no details regarding the calculation of present values he proposes to optimize. It is possible, however, to get some reflections of his thinking from the discussion of the present value criterion in the article. It is likely that Dr. Black believed that present values were uncertain, depended on future events, and, therefore, could be optimized. If Dr. Black had thought about “present values” as of certain “market values,” there would have been no way to optimize them. After all, a market value is a perfectly known number. It is also likely that Dr. Black believed that there was a relationship between present values and future risks, as evident in the following quote.

*“A very risky strategy with high present value, though, may hurt the plan participants. We should only consider strategies with low or moderate risk.”*

At the same time, Dr. Black apparently thought that present values had little to do with asset diversification.

*“Diversification does not affect present value in any direct way. ... Similarly, the allocation of a plan’s assets between debt and equity investments does not directly affect the assets’ present values.”*

Then, how would one minimize the present value of future contributions if asset allocation were essentially irrelevant?

### **Black vs. Black**

For a moment, let us think of option pricing, an area in which Dr. Black’s achievements are eminent. In simplified terms, a well-known technique of valuing an option involves taking a scenario of future events, determining future cash flows under this scenario, and taking the present value of these cash flows. The mean (expected value) of these present values for all future scenarios can be viewed as the value of the option. That is what the Black-Scholes formula essentially does. *“Why not use the same criterion to make pension fund investment decisions?”*

*Conjecture 3.* Dr. Black may have thought that pension plans could be valued similar to options.

*Conjecture 4.* Dr. Black may have viewed “the present value of future contributions” similar to the value of an option, namely as the mean of present values of future contributions taken over all future economic scenarios.

This conjecture may explain how Dr. Black may have envisioned the decision-making framework for pension investing. A risky strategy that may cause large swings in asset values would produce large contributions along a considerable segment of scenarios and, consequently, generate a higher expected present value. A safe strategy that has little chance of generating high returns would produce stable but high contributions and, consequently, generate a higher expected present value as well. The challenge, therefore, is to find the right trade-off between risky and safe strategies. “Very risky” strategies, according to Dr. Black, should be avoided regardless of the present value they generate.

An optimal “project” would result in the lowest expected present value of future contributions, which, in turn, would result in the highest present value of the corporation. In this framework, the following statement makes perfect sense.

*“The plan sponsor could choose assets that have the highest possible present values.”*

At the same time, Dr. Black makes the following notable statement (twice).

*“The present value of \$100 in stocks is equal to the present value of \$100 in bonds.”*

These two statements are clearly incompatible. Statement “the present value of \$100 in stocks is equal to the present value of \$100 in bonds” indicates that Dr. Black uses a *backward-looking framework that ignores future risks*. In this case, \$100 in stocks is the same as \$100 invested in any tradable asset at this instant. In this framework, “assets that have the highest possible present values” do not exist – they are all \$100.

Assets that have the highest present value exist only in forward-looking frameworks. We have to look into the future and *consider a multitude of future risks* in order to find “assets that have the highest present value.” But if we look into the future, \$100 in stocks and \$100 in bonds are quite different because their forward-looking risk/return characteristics are different. One cannot have it both ways.

“The Plan Sponsor’s Goal” presents a stunning clash of two Blacks – Dr. Black one of the founders of the “tax arbitrage” and Dr. Black one of the founders of option pricing. The former thought that \$100 of stocks was the same as \$100 of bonds *if we did not look into the future*. The latter surely knew that stock and bond based options (other things being equal) would be priced differently, since forward-looking volatilities of stocks and bonds were different. Hence, \$100 of stocks was *not* the same as \$100 of bonds *if we did look into the future*.

Therefore, a lot depends on what we are up to, or, as Dr. Black put it, “*how we set up the goals of a pension plan sponsor matters a lot*.” In particular, to look or not to look into the future “matters a lot” as well.<sup>5</sup>

### **The Lessons of “The Plan Sponsor’s Goal”**

It is safe to say that “The Plan Sponsor’s Goal” is a remarkable, yet controversial article. Obviously, Dr. Black had neither clarified every point nor provided explanations for every concept he used in the article. He may have thought that delivering the main message of the article - “how we set up the goals of a pension plan sponsor matters a lot” – was much more important than describing all details. Nonetheless, “The Plan Sponsor’s Goal” contains several important ideas that deserve a comprehensive discussion, the controversial language of the article notwithstanding.

This author would like to emphasize a couple of these ideas. The first idea is the significance of articulating the plan sponsor's goal, which is probably the most important assumption in any asset allocation problem. Dr. Black's observation that different asset allocation goals "lead to different answers to our investment policy questions" is imperative. Most authors on the subject of asset allocation have yet to appreciate the significance of this notion.

Incidentally, Peter Bernstein came to a similar conclusion in his paper "Which Policy Do You Mean?" eight years after "The Plan Sponsor's Goal."

*"... we should be asking which "policy" a policy portfolio is designed to fulfill."*<sup>6</sup>

In other words, a clear articulation of the role of the policy portfolio is critical. P. Bernstein looks at the problem from a different angle.

*"... the policy is to provide the investor with the highest probability of being able to pay for the groceries when the time comes."*

F. Black recommends minimizing the cost of funding a financial commitment and P. Bernstein recommends maximizing the likelihood that the commitment will be funded. Remarkably, these recommendations lead to the same set of optimal policy portfolios (the cost-risk efficient frontier).<sup>7</sup> Essentially, Black and Bernstein recommend the same forward-looking approach.

The second idea is the importance of optimizing *present* values rather than *future* values. We are only beginning to grasp the significance of this concept. Valuing retirement programs similar to options is a great idea that offers powerful analytical tools. It is becoming increasingly clear that the analysis and optimization of stochastic present values can play a key role in the design of optimal portfolios for both defined benefit and defined contribution retirement programs (especially life-cycle funds).<sup>8</sup> Even though Dr. Black did not explicitly recognize the importance of stochastic present values, he should be credited with the idea that optimizing the uncertain cost of a retirement program is a worthy goal.

Perry Mehrling in his book "Fischer Black and the Revolutionary Idea of Finance" observed that "*Fischer was, as usual, too far ahead of his potential clients.*"<sup>9</sup> The ideas presented in "The Plan Sponsor's Goal" may very well become another confirmation of this observation.

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## Endnotes

<sup>1</sup> The Kerwin-Ennis hypothesis that “*then-editors either added the abstract or modified its wording*” has turned out to be incorrect. The May/June 2009 issue of the FAJ contains a letter written by Prof. P. Mehrling and this author that demonstrated that the article, in its entirety, is the work of Fischer Black. Mr. Ennis published an elegantly worded retraction in the same issue.

<sup>2</sup> See Black [1995].

<sup>3</sup> See Black [1980].

<sup>4</sup> See Black [1989].

<sup>5</sup> For more details regarding the issue “to look or not to look into the future,” see Mindlin [2008].

<sup>6</sup> See Bernstein [2003].

<sup>7</sup> See Mindlin [2010].

<sup>8</sup> See Mindlin [2009].

<sup>9</sup> See Mehrling [2005], p. 222.