

**Retirement Shares Plan:
A New Model of Risk Sharing**

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Abstract

Investment risk and longevity risk are borne by the plan sponsor in a defined benefit (DB) plan or by the plan participant in a defined contribution (DC) plan. By contrast, our proposed Retirement Shares Plan (RSP) allocates the longevity risk to the plan sponsor and investment risk to the plan participant. The RSP allows the participant sufficient control over the investment risk to tailor that risk to his specific circumstances. This allocation of risk provides predictable and stable cost to the plan sponsor with little chance of unfunded liabilities. The retiree receives lifetime income and potential inflation protection.

Keywords: investment risk, longevity risk, Retirement Shares Plan

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Retirement Shares Plan: A New Model for Risk Sharing

Traditional defined benefit (DB) plans burden a plan sponsor with three principal risks: investment risk, interest rate risk, and longevity risk.¹ Traditional defined contribution (DC) plans place these three risks with the individual. This chapter explores the effects of these risks on the plan sponsors and the individuals, and it also proposes a plan design that allocates these risks differently. The Retirement Shares Plan (RSP) allocates investment risk to the individual, longevity risk to the plan sponsor, and eliminates interest rate risk.

Interest Rate Risk

Sponsors of traditional DB plans must reflect on their balance sheets a liability representing the present value of accrued pension benefits. These accrued benefits are payments due to participants in future years. For financial statement purposes, these fixed future payments are considered similar to debt. The future payments must be discounted to the financial statement date with an interest rate that reflects the yield on high-quality fixed-income securities with duration similar to that of the estimated benefits. The plan's current year expense includes the present value of additional benefits expected to be accrued during the year discounted in the same manner. The market yields on which the discount rate is based can be volatile and change significantly from one year to the next. As a result, the liability and current year costs associated with the DB promise can be volatile. This volatility of the liability and cost we refer to as the interest rate risk.

In a traditional DC plan, the sponsor's commitment is to make a contribution each year to the plan on behalf of participants: the sponsor thus records as a cost the actual contribution. Contributions for future years are not considered accrued at the financial statement date because they are dependent upon the employees providing service in the future, and because the sponsor

usually has the right to cease making contributions at any time. Accordingly, the sponsor does not record a liability on its balance sheet other than for accrued but not yet paid contributions. Because the sponsor's cost and liability (if any) does not involve discounting future payments, there is no interest rate risk.

The participant in a DC plan holds an asset equal to the account balance. Since the participant has no obligation to make any payments or transfer these assets to any other party, the participant has no liability, does not discount any future cash flows, and has no interest rate risk as we have defined it. The participant may experience volatility in investment returns due to changing interest rates, but we consider that under investment risk.

Investment Risk

Sponsors of DB plans contribute assets to the plans to meet their current and accrued costs. These assets are invested and are used to pay benefits due in the future. Plan assets are reflected on the sponsor's balance sheet as an offset to the plan's liabilities. In the U.S., plan assets are reported at market value and thus subject the plan sponsor to investment risk: the volatility of the investment portfolio is directly reflected on the sponsor's financial statement.

Sponsors of DC plans also contribute assets to the plan to meet their commitments, but plan assets are not reflected on the sponsor's financial statement because they are not offsetting any liability for future payment. The assets transferred to the plan generally discharge the sponsor's financial commitment. As a result, the sponsor of a DC plan is not subject to any volatility associated with investment risk.

The DC plan participant has an invested asset, and the benefit he will ultimately derive from the plan depends on his investment experience. The entire investment experience is

immediately reflected in the participant's account balance, thus the participant bears the full investment risk of the account. In most DC plans, the participant can manage this risk by selecting the investments from a broad array of funds with varying risk characteristics.

The investments in a DB plan are generally managed by investment professionals and the asset allocation decisions are made by the plan sponsor (usually with the advice of investment professionals). Investments in DC plans are also managed by investment professionals, usually through mutual funds, but the asset allocation decisions are usually made by individual employees rather than investment professionals.

Longevity Risk

The sponsor of a DB plan promises to pay benefits for the lifetime of the plan participant (and possibly the participant's spouse or beneficiary). Actuaries estimate the value of these benefits using mortality tables. Since life expectancies have been rising, liabilities can be understated if the mortality tables do not reflect anticipated future improvements in longevity. All DB sponsors have exposure to risk due to systemic improvement in longevity experience.

DB plans are also exposed to the mortality experience of their participants. For small plans, this experience can be erratic. Small plans often mitigate this risk by paying lump sum benefits at retirement or by purchasing annuities from an insurance company. A lump sum payment transfers the longevity risk to the individual and, because the lump sum is usually based on a static mortality table, eliminates longevity risk for the sponsor. Large plan experience tends to be less erratic with trends gradually emerging over many years. Liabilities seldom change by more than one percent per year unless a change in the mortality table is adopted. Although these plans have exposure to long-term systemic changes in mortality experience, the year-to-year changes in liability are

generally far less volatile than investment or interest rate risk. Large plans generally fund toward the average life expectancy of the population, recognizing that some will live longer, offset by others that do not.

The individual in a DC plan is subject to longevity risk of a different sort. While a large DB pension plan can pool the longevity experience of many participants, the DC participant must manage longevity experience of just one person (or one couple). The individual generally does not know how long he will live nor how long his assets must last. Planning for the average life expectancy is generally insufficient since there is a 50 percent likelihood of exceeding this. An individual can transfer this risk to an insurance company by purchasing an annuity, but few individuals do so. Longevity risk poses a challenge to the individual that is difficult to manage: spend less to accommodate a long life, or spend more and risk exhausting the funds.

Variable Annuity Plans

A variable annuity plan is a form of DB plan that allocates risk differently than traditional DB plans or DC plans.² A variable annuity plan is generally a career accumulation plan: it accumulates benefits for each year of service rather than basing benefits on final average pay. Benefits can accrue as a percent of pay, say one percent of actual earnings each year payable as an annual annuity at normal retirement, or as a dollar amount, say X dollars per month for each year of service, also payable as an annuity at normal retirement.

Unlike a traditional DB plan, the sponsor does not promise to pay a fixed amount throughout retirement. Instead, the benefit is 'indexed' and generally changes every year, both while the participant is working and accruing benefits, and after the participant retires and is receiving benefits. Indexing is usually associated with cost-of-living increases. Many public sector

pension plans have benefits that are at least partly indexed to the cost-of-living index for retirees in pay status. A few career accumulation plans index accruals during employment (indexed career accumulation plans): those plans may or may not also index retiree benefits.

A variable annuity plan indexes benefits to investment results rather than a cost-of-living index. The plan document must state the methodology used to determine the indexing. Usually the plan defines an investment return benchmark, sometimes referred to as a 'hurdle rate' or an assumed investment return, which determines the investment return needed to keep benefits constant. If actual investment returns exceed this rate, benefits are increased by the excess rate. If the actual investment return falls short of the benchmark, benefits are decreased by the shortfall. For example, if a plan defined the benchmark investment return as four percent and the actual return for a year is seven percent, benefits would be increased by approximately three percent.³ Likewise, if the actual return for the year was only one percent, all accrued benefits would be decreased by approximately three percent.

To facilitate recordkeeping, variable annuity plans often convert benefit accruals into variable annuity units. Each variable annuity unit entitles the participant to a lifetime income commencing at normal retirement age equal to the unit value at the time of payment. Variable annuity unit values are adjusted each year by the indexing formula defined in the plan. Tracking the accrued benefits as variable units rather than dollar amounts does not change the nature of the plan or the benefits due the participant, but it can make plan administration easier. Individuals familiar with mutual funds should be able to easily understand this concept.

A variable annuity plan meets the requirement for 'definitely determinable benefits' under the law, provided that the plan states the methodology for the indexing and uses a recognized investment method or investment index. A variable annuity plan does not violate the ERISA

requirement that the sponsor cannot amend the plan to decrease benefits. This is because a decrease due to investment under performance is not an amendment decreasing benefits: rather it is a decrease necessitated by existing plan provisions.

Variable annuity plans have risk characteristics quite different from traditional DB plans. Because investment gains or losses directly change the amount of accrued benefits, volatile investment results have little or no effect on the sponsor's net obligation. An investment gain increases liabilities by an offsetting amount and an investment loss decreases liabilities by an offsetting amount. Essentially, the investment risk borne by the plan sponsor in a traditional DB plan is transferred to the participant in a variable annuity plan via the indexing of the benefit to investment results.

Like DC plans, variable annuity plans have no interest rate risk for the plan sponsor or the participant. Fixed interest rates are used to discount future fixed payments. Benefits that vary based on actual investment returns have a present value that is independent of changes in interest rates. All obligations can be valued at a fixed rate equal to the benchmark investment return or hurdle rate defined by the plan. The sponsor's obligation is to fund all benefits based on this rate of return and this amount will be sufficient regardless of the actual return on plan assets or any changes in market interest rates.⁴

Variable annuity plans maintain the longevity risk with the plan sponsor as in traditional DB plans. Variable annuity plans also have other demographic risks to which the sponsor is exposed including turnover and early or late retirement. Variable annuity plans can develop unfunded liabilities or surplus assets similar to traditional DB plans due to demographic gains and losses, or due to the sponsor's funding policy.

To minimize risk, the full costs of the plan need to be funded promptly and demographic gains or losses need to be managed promptly. If the full costs are not promptly covered, any unfunded liability or surplus assets can produce investment gains and losses. For instance, if the plan is 90 percent funded and then experiences a 10 percent investment gain, liabilities will increase by 10 percent but only 90 percent of that increase will be offset by the investment gain, thus the unfunded liability will grow. In other words, to keep the sponsor free of any investment risk, the plan must be fully funded. Any unfunded liability or surplus assets expose the sponsor to investment risk on the deficit or excess. Nevertheless, regardless of any such deficit or excess, the sponsor is not exposed to interest rate risk.

Hurdle Rate Characteristics

The hurdle rate is a key component of plan design that affects both benefits and costs. The lower the hurdle rate, the more valuable the benefits are to participants, because they are more likely to increase in the future. For a given plan formula, say one percent of compensation accrual per year, a plan with a lower hurdle rate is more expensive to fund for the plan sponsor. For example, if two plans, A and B, have the same accrual formula, but A uses a three percent hurdle rate and B uses a five percent hurdle rate, plan A will be more expensive to fund. In each year, accrued benefits in plan A will grow about two percent more (or decrease two percent less) than plan B.

Hurdle rates in the United States are seldom less than three percent because such a plan would likely violate the minimum distribution rules of ERISA.⁵ A plan with a hurdle rate less than three percent is presumed to deliver an increasing annuity that would violate the minimum distribution rules.

Plans subject to ERISA with hurdle rates less than five percent are deemed to be statutory hybrid plans and must use three-year vesting. Plans with higher hurdle rates have lower cost for the plan sponsor, but they also increase the risk that benefits may decrease. For example, a hurdle rate of 10 percent would produce a very low cost plan, but benefits for participants would be highly likely to decrease in most years, probably resulting in much dissatisfaction with the program. High hurdle rates may expose the sponsor to other compliance issues also. There are currently no regulations addressing this issue.

Investment Risk Transfer

Variable annuity plans generally index benefits based on the entire assets of the plan, a designated portion of the plan assets, a specific investment index, or the return of a specific registered investment company. All plan benefits are indexed exactly the same way. As a consequence of this, all plan participants experience the same volatility in their accrued benefits. This can produce conflict among participants with varying risk characteristics and difficulty for trustees responsible for setting the plan's investment policy.

Young participants who are actively accruing benefits are not immediately affected by volatility of investment results. Volatile investment returns may actually benefit them in a way similar to dollar cost averaging. Young participants with many years until retirement may prefer a very aggressive investment policy in the expectation that their benefits could grow substantially by retirement.

By contrast, employees approaching retirement may prefer a less aggressive investment policy, since they have a more immediate need for the plan payments. A very aggressive investment policy would make these projections less reliable.

Retirees are likely to be even less risk tolerant. Retirees may be dependent on their benefits to pay fixed expenses. As a result, they would likely prefer a conservative investment policy which attains the hurdle rate each year with little likelihood of a loss.

The trustees of the plan must act on behalf of all participants and find a way to balance these various interests. Many variable annuity plans do so by adopting balanced portfolios, often with no more than 50 or 60 percent equity exposure with the balance in fixed income or other stable investments. The result is a compromise portfolio that will not meet the exact needs of most participants but is deemed reasonable. Of course, this compromise still exposes retirees to the potential loss of income if the balanced portfolio does not consistently earn the investment hurdle rate. So some plan sponsors highly desirous of the stable cost and low volatility of the variable annuity plan are nevertheless reluctant to adopt such a plan because of the possibility of declining benefits for retirees.

The Retirement Shares Plan

The Retirement Shares Plan (RSP) is a concept that enables participants to tailor their plan risk exposure to their own risk tolerance. In its simplest form, the Trustees can partition the plan assets into two subaccounts, we here call the 'Diversified Account' and the 'Stable Account.' The Diversified Account would have an investment policy designed for long term growth with its objective to exceed the hurdle rate return by a margin equal to the inflation rate. If the investment account attained this objective, benefits backed by the Diversified Account would increase similar to a cost-of-living adjustment and benefits would retain constant purchasing power.

The Stable Account would have an investment policy designed for consistent income and stable pricing. Investments would generally be in high-quality fixed income investments with only

small, if any, exposure to equity markets. The goal of the Stable Account would be to attain or exceed the hurdle rate in most years. Such a plan would need to have a relatively low hurdle rate, probably not higher than four percent.

In such a plan, the Diversified Account and the Stable Account would each establish a share value at inception. The initial share value of both accounts is arbitrary and could be set at, say, \$10.00; thereafter, the two share values will experience different growth rates based on the actual return of each account. The Diversified Share and the Stable Share each entitles the participant to a lifetime income at normal retirement age equal to the share value at the time of payment. These shares would be equivalent to the unit accounting in most variable annuity plans.

The Diversified Account would be the default fund for all participants. All benefit accruals would be converted to 'shares' of the Diversified Account. A share entitles the participant to a lifetime income commencing at normal retirement age equal to the share value at the time of payment, just as variable units do in a typical variable annuity plan. A participant in the plan who stays with the default until retirement would be entitled to a lifetime income at normal retirement age based on the number of Diversified Shares accumulated at retirement and the share value at that time.

An example helps illustrate how this can work. Assume a plan has an annual accrual of one percent of pay. Pat, a participating employee, earns \$50,000 in a particular plan year. At the end of that plan year, Pat has accrued a benefit of \$500 as a variable annuity at normal retirement age. If the Diversified Share value at the end of that plan year is \$12.50, Pat's benefit accrual is converted to 40 Diversified Shares.

Pat continues to work and earn more Diversified Shares each year. At his normal retirement age he has accumulated 1,200 Diversified Shares and the Diversified Shares have grown to a value

of \$16.00. Pat would be entitled to an annual benefit of \$19,200 (1,200 x \$16.00). In each subsequent year, Pat's benefit would be based on the new share value. The benefit would always be 1,200 multiplied by the then-current value of a Diversified Share. Following a year like 2008, Pat's benefit amount might drop significantly. On the other hand, following a year like 2013, the benefit would increase significantly.

To this point, the example is similar to any variable annuity plan. But we suppose that at retirement Pat looked at projected expenses and income carefully, and he decided that the Diversified Shares had more risk and volatility than he felt appropriate. In a Retirement Shares Plan, Pat could choose to convert all or part of the Diversified Shares to Stable Shares. Suppose that Stable Shares at Pat's retirement had a value of \$10.80. Pat could convert the 1,200 Diversified Shares with an annuity value of \$19,200 to 1,777.777 Stable Shares that also have an annuity value of \$19,200. Assuming the plan allowed partial transfers, Pat could convert any number of the Diversified Shares to Stable Shares so that some of the annual income would be stable while the rest would vary with Diversified Shares. Pat could structure the retirement income volatility to appropriate levels for Pat.

To keep the plan sponsor protected from investment risk, the sponsor would transfer the actuarial value of Pat's benefit from the Diversified Account to the Stable Account. The actuarial value would be the life annuity for Pat evaluated at the hurdle rate of interest.

This simple example is based on two types of shares, Diversified and Stable, with the Diversified Share being the default. Transfer to the Stable fund was illustrated at the time of retirement. While this is a simple example, there are many variations that could be adopted if the sponsor is willing to invest in the administration system to handle a more complex retirement shares program. A few alternatives are considered below.

When To Permit Transfers. To facilitate recordkeeping and ease of transferring money between accounts, permitting transfers once per year will minimize efforts and probably be sufficient to accomplish most risk mitigation for participants. Allowing transfers at benefit commencement is the most obvious time, but plans could offer other opportunities. Retirees in pay status could be offered an opportunity to transfer shares once per year. Our initial example illustrated a transfer from Diversified to Stable, but a participant might subsequently be in different circumstances and like to transfer from Stable to Diversified. Such a transfer poses no financial risk to the sponsor, provided the appropriate actuarial reserve is also transferred between accounts.

Participants nearing retirement age might like to transfer some of their accrual to the Stable Shares before actually retiring. Again, provided the appropriate reserve is transferred, this poses no risk to the plan sponsor and could be permitted. In fact, in the extreme, participants of any age could be permitted to transfer shares from one account to the other. However, allowing daily transfers among funds is probably inappropriate, in that a variable annuity DB plan is usually not intended to be an investment vehicle for frequent trading. The Retirement Shares Concept is intended to permit participants to avoid inappropriate risk for their retirement income, and not to create an investment trading platform.

Multiple Accounts. The two-account model with a diversified and a stable account, together with the ability to transfer all or part of the benefit between accounts, can provide participants with a wide range of risk exposure. In this model, the upper end of risk exposure is capped based on what the plan trustees select for the diversified account. The lower level of risk is attained if 100 percent of the benefit is transferred to the Stable Fund.

While this two-fund model provides a wide range of risk exposure, it is conceivable that some participants might be willing to experience more volatility to attain greater growth. This

might be particularly true of young participants who are many years from retirement. Greater risk exposure could be attained by adding a third account invested entirely in equities, designated as the Equity Shares. Participants wanting more growth than the Diversified Shares provide could transfer some of their benefit to Equity Shares. To prevent participants from taking excessive risk with retirement funds, sponsors might consider placing limits on the proportion of benefit transferred to Equity Shares.

Although it is conceivable to envision a plan with many more classes of shares, there seems little to be gained by the addition of more funds. Even the addition of Equity Shares as a third fund offers marginal utility at greater administrative expense and the risk of creating a confusing plan that participants will not understand nor appreciate.

Illustrations. The hypothetical Retirement Shares experience can easily be constructed for past years based on investment indexes. The S&P 500 Index total return (including dividends) and the Barclays Aggregate Index (also total return) were obtained from the Society of Actuaries Investment Statistics for Pension Actuaries for the years 1970 through 2013. For illustrative purposes, we assume that a Diversified Share consists of 70 percent S&P 500 and 30 percent Barclays Aggregate. A stable share is 100 percent Barclays Aggregate.

Figure 9.1 plots the changes in the Diversified Share value through a 43-year period. Several features stand out. First, the share value generally increases. Unlike a fixed pension benefit, the pension benefit amounts are growing due to aggregate investment experience that exceeds four percent. Second, the growth generally exceeds that of the consumer price index. Third, although the trend is generally increasing, there are three periods in which benefits decline significantly: from 1972 to 1974 benefits declined 32 percent, from 1999 to 2002 benefits declined 28 percent, and from 2007 to 2008 benefits declined 29 percent. In each of these occurrences, the Diversified

Share value recovered and exceeded its previous high within five years. Over this period, a retiree who could sustain a temporary decline of income of about 30 percent was rewarded with an income that on average increased faster than inflation as measured by the Consumer Price Index.

Figure 9.1 here

Not all retirees would be willing to take the risk of a 30 percent decline in income, and there is no assurance that future declines would not be greater than 30 percent. A risk averse retiree unwilling to experience the potential volatility of the Diversified Shares could transfer all or part of his benefit to Stable Shares. Figure 9.2 shows the growth of a Stable Share backed by the Barclays Aggregate Index over this same time period. The stable share value fulfills its name, with generally little volatility over the 43 year period, but it falls far behind inflation, as does a fixed pension benefit. In periods of low fixed income returns, the Stable Share may decline as it did in 2011–13.

Figure 9.2 here

Why Retirement Shares?

The Retirement Shares design offers distinct differences from traditional DB or DC plans. Like a DC plan, the Retirement Shares design eliminates interest rate risk and transfers investment risk to the individual, thus providing the sponsor a stable cost pattern without major balance sheet effects. Also like a DC plan, the benefits are portable: individuals continue to receive the full investment performance of the underlying funds even after they leave employment. Like a DB plan, the Retirement Shares plan provides lifetime income and creates the efficiencies of pooling longevity experience over large groups.

There are drawbacks to the Retirement Shares design; for instance, benefit payments are less certain under a variable annuity plan design than in a fixed DB plan. Sponsors or individuals who highly value the certainty of a fixed benefit will not appreciate the volatility of the diversified shares and see no advantage to the stable shares that still vary. Highly portable benefits do not provide the strong retention value of the traditional final pay DB pension.

The benefit accrual pattern of the Retirement Shares plan increases with age similar to that of a career accumulation DB plan. Those who prefer the level accrual pattern of a DC plan or cash balance plan may not like the upward sloping accrual pattern of the Retirement Shares design. Level accrual could be attained by a cash balance design with a variable annuity payout rather than a fixed annuity payout.

Conclusions

Variable annuity plans can provide lifetime income to participants without the risk of running out of money at advanced ages. In exchange for such a guarantee of continued income, the participant accepts the risk and reward that the actual investment returns provide. Variable annuity plans provide the sponsor with cost stability and predictability similar to DC plans, but the sponsor accepts the risk of longevity which is generally increasing but not volatile. The Retirement Shares Plan enhances a typical variable annuity plan by allowing participants to elect a more stable benefit than that from a traditional variable plan. This feature allows the trustees to adopt a more aggressive investment portfolio for the default portion of the fund, thus potentially providing greater growth in retirement income for participants and the potential to maintain purchasing power.

Endnotes

¹ Plan sponsors bear several other risks including compliance risk, fiduciary risk, administrative risk, etc., but investment, interest rate, and longevity are the principle risks associated with the financial commitment to deliver the promised benefit.

² Variable annuity plans should not be confused with the variable annuity products commonly offered by insurance companies which are primarily investment vehicles with certain tax advantages.

³ Most plans base the indexing on a ratio of returns where the change in benefits is equal to $(1+i)/(1+h) - 1$ where i is the actual return and h is the benchmark or hurdle return. In the example, this would result in an increase slightly less than 3 percent.

⁴ Actuarial Supplement to The Retirement Shares Plan: A Breakthrough in Retirement Plan Design, Donald E. Fuerst, Society of Actuaries, 2006.

⁵ The Employee Retirement Income Security Act of 1974, the relevant legislation pension plans in the United States.

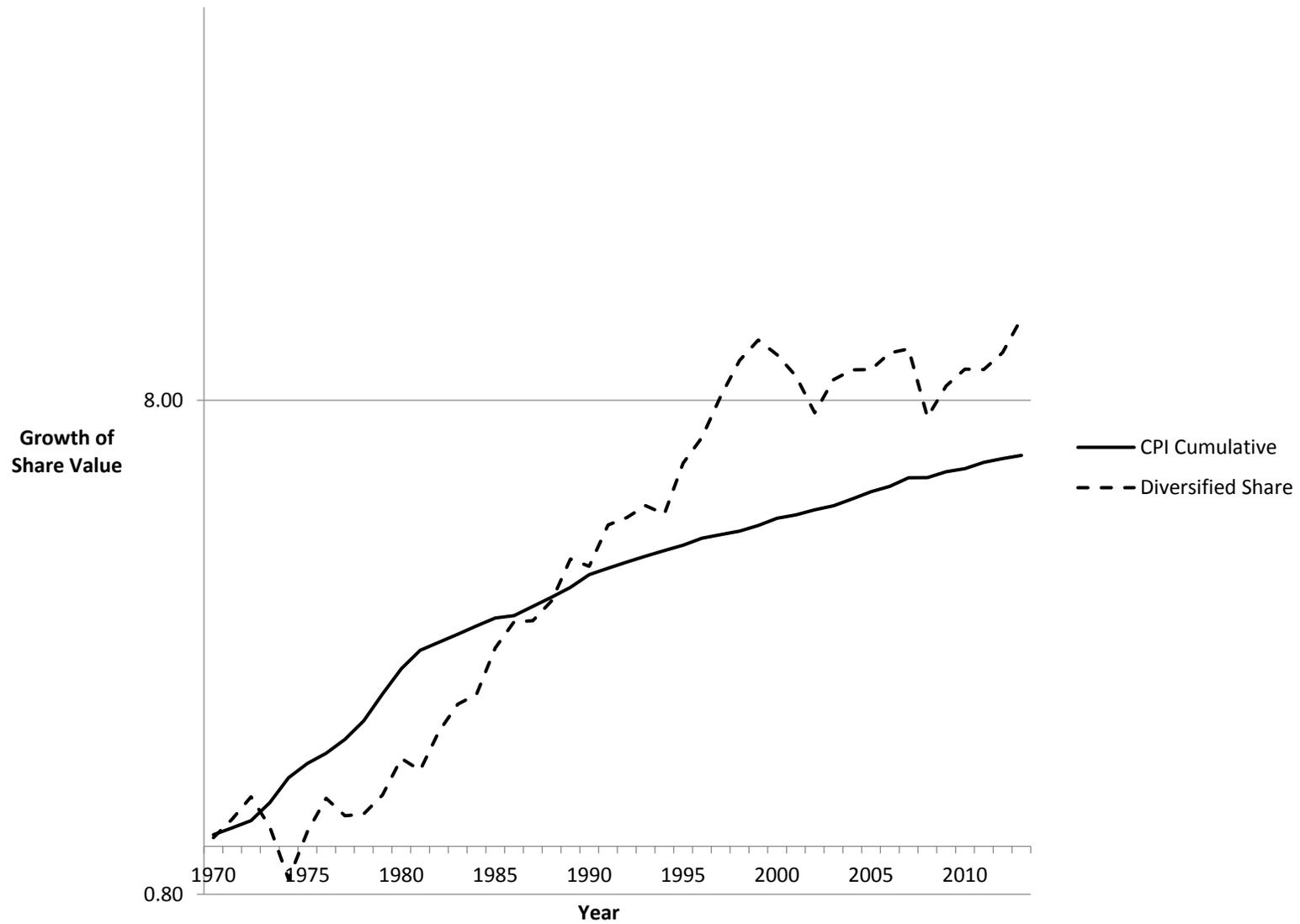


Figure 9.1. Diversified Share vs. CPI Four Percent Hurdle Rate 1970-2013 Logarithmic Scale. *Source:* Author's computations.

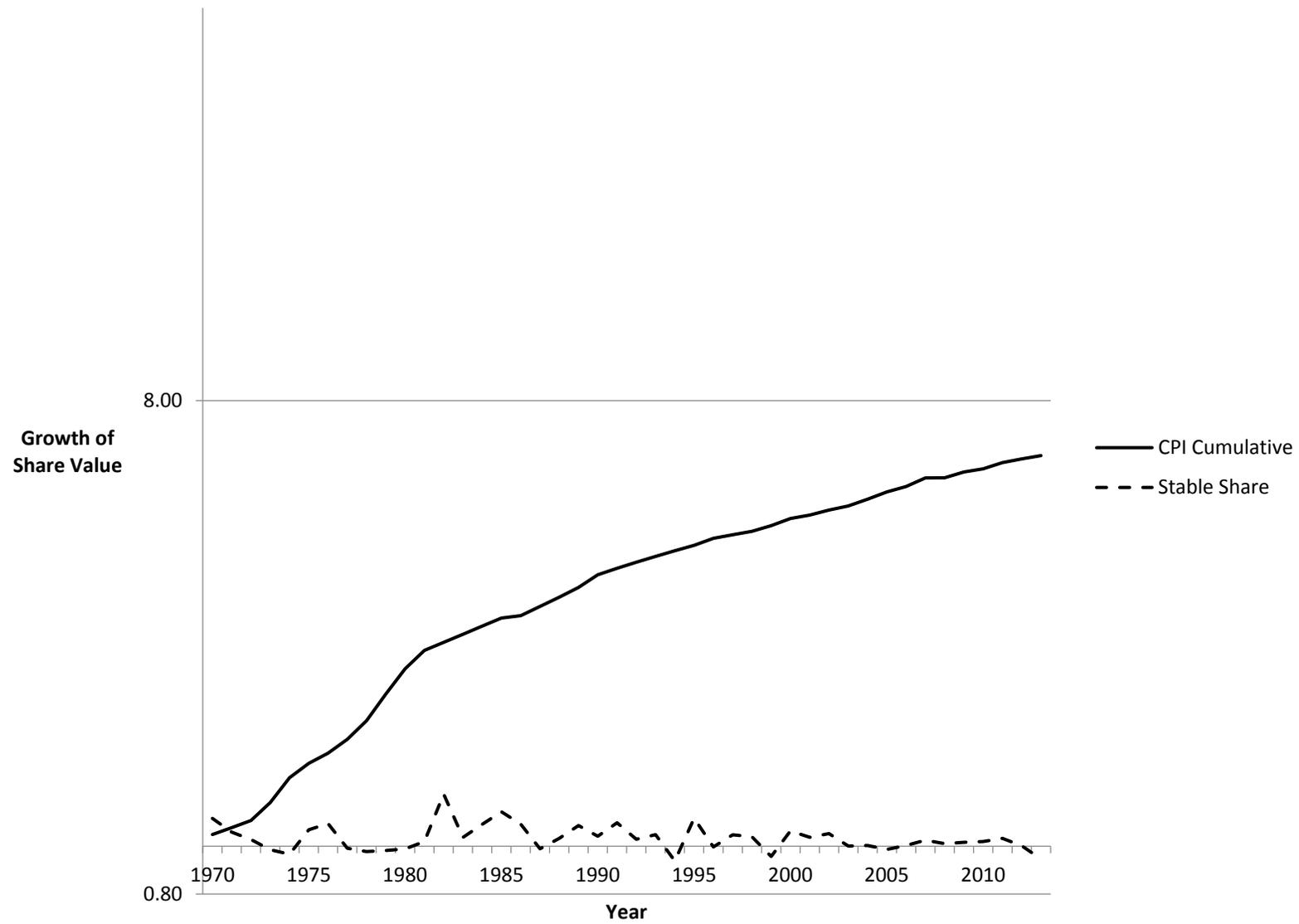


Figure 9.2. Stable Share vs. CPI Four Percent Hurdle Rate 1970-2013 Logarithmic Scale. *Source:* Author's computations.