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Willingness to pay: understanding 403(b) fees

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Abstract

While the private pension system relies heavily on the 401(k) construct, the public and nonprofit sectors' 403(b) plan market is of considerable magnitude but has attracted less academic research. This essay seeks to explore the theoretical underpinnings of demand for 403(b) services, estimate an average willingness to pay for these services and compare that estimation with empirically observed data. It concludes by determining that some 403(b) service providers have historically captured the bulk of the consumer surplus afforded to individual consumers in this market.

JEL classification: G23

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1. Introduction

At first glance, the differences between 403(b) and 401(k) plans might seem superficial. Both are retirement plans with the former crafted for public and nonprofit sector workers and the latter made for the private, for-profit sector. Participants in both elect some nonnegative percentage of pay to defer into an account to grow tax-deferred until withdrawal at retirement. Many of the legal provisions guiding the limitations on deferrals, the right of the participant to their own account balance and the tax consequences of withdrawing retirement monies prematurely have been historically similar.

However, there have also been some key differences in the regulation of these two types of defined contribution retirement plans that can lead to a substantive difference in the wellbeing of participants during their retirement years. Most specifically, 403(b) plans have

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not been subject to the written plan document requirement and some of the nondiscrimination testing requirements that currently govern 401(k) plans. These differences in regulation have led to a fundamental difference in the way that these two plans are marketed and administered. The 401(k) plans have been marketed to the plan sponsor, with the service provider contracting with the sponsor to provide services to the entire group of participants. Conversely, 403(b) plans have been sold and administered at the individual level. Such a difference immediately raises theoretical questions about the outcomes for participants. A 401(k) sponsor's employees are effectively forced to utilize the services offered by the sponsor-chosen provider if the employee wishes to participate in the 401(k) plan. As De Rooy (2006) notes, "Generally, the employee has no voice in selecting the investment companies in their retirement plan: the employer's selection of an investment company determines the mutual funds available to employees, and the management expenses they must pay."

This basic structural nature of 401(k) plans begs obvious questions: Does this de facto monopoly arrangement cause some form of deadweight loss to 401(k) participants? On the other hand, could we view retirement services for a firm's employees as a natural monopoly so that 403(b) participants suffer by paying unnecessarily high fees for retirement plan administrative services? We will proceed in the latter direction as the empirical evidence seems to suggest the latter question is the more relevant.

The 403(b) market, while small in comparison to the 401(k) market, still boasts $743 billion in assets (Investment Company Institute, Vol. 16 April 2008). The market has not been well studied in the literature, presumably because of the historical lack of the annual reporting requirements that mark the 401(k) world. Simply put, broad scale 403(b) data are not readily available. However, data can be drawn from private sources and such is the case in this study. The 403(b) fee schedules from five substantial providers, each with a market share of up to 9%,[1] are studied in comparison to a theoretical analysis of what participants would be willing to pay for 403(b) administrative services. However, first, we will explore some related literature and some comparative static analysis of the factors that influence a participant's willingness to pay for 403(b) services.

2. Literature review

Mitchell (1998) provides a close look at the nature and magnitude of administrative costs in retirement systems, both public and private, and comments on the inherent difficulties in fruitfully comparing the two. Given Social Security's largely unfunded status, it is impossible to meaningfully calculate cost as percentage of plan assets, the standard technique for expressing private retirement system costs. She provides an explanation of the various expenses associated with mutual funds, the preferred investment vehicle for many defined contribution plans. Finally, she reports on the administrative expenses associated with private retirement plans, noting that these expenses for non-401(k) defined contribution plans in 1992 averaged 0.15% of plan assets. She correctly notes that the then-nascent participant directed 401(k) plans "would require somewhat more administration than individually purchased mutual funds, inasmuch as the tax-qualified plans permit participant involvement

in the asset-allocation process and also require monitoring for tax purposes" (Mitchell, 1998).

There is a body of puzzling evidence that mutual fund investors pay little attention to the level of fees charged by the investment funds they choose. Wilcox states, "The academic record on fund expenses is absolutely clear. Investors should pay a great deal of attention to the fee structure imposed by various funds when making a fund selection" (Wilcox, 2003). However, he finds that investors making a fund choice heavily weight past performance while suboptimally choosing a fee structure. Most curiously, those who demonstrate the greatest financial savvy are those with the greatest tendency to improperly select a fee structure by overly focusing on the load. Choi, Laibson, and Madrian (2008) set up an experiment in which participants are asked to choose from four S&P 500 index funds. By the passive and homogeneous nature of these funds, the expected return is homogenous and the dominant strategy should be to minimize fees, but the participants "overwhelmingly" fail to do so and instead focus on historical performance.

It should be noted that mutual funds of different strategies and asset classes tend to exhibit different fee levels. Passively managed index funds generally display lower fee levels than their actively managed counterparts. Such result is entirely intuitive, the index fund firm need not expend money on the human capital necessary to decide which assets to purchase as the purchase mix is predetermined by the mimicked index. Similarly fees in actively managed small cap equity funds tend to exceed those of their large cap counterparts with the explanation again falling to the level of human capital needed to choose from among a mere hundreds versus thousands of potential stocks. However, the lack of similarity in fee structures within any given asset class can be rather startling. De Rooy (2006), for instance, observes a bimodal distribution of expense ratios within the growth equity fund class, with modal values at 1.25% and 2.25%.

Of course, a focus on fees might be deemed unmerited if the payment of a high fee results in superior investment performance. Indeed, such is the sales pitch of many investment advisors. However, the academic evidence for higher fees resulting in higher investment returns is rather spotty. Grinblatt and Titman (1989) found evidence of persistence in mutual fund performance and asserted that "past performance of a fund provides useful information for investors who are considering an investment in mutual funds." However, Shulkla (2004) found that "managers who generate excess returns charge higher fees from the stockholders." Wilcox's (2003) literature review concluded that it is difficult to detect persistence in risk-adjusted mutual fund performance. Thus, the witness to the efficacy of paying higher investment management fees is somewhat mixed.

Reacting to the various ways in which mutual fund fees are typically levied, Livingston and O'Neal (1998) develop a formula by which funds with different fee structures can be mathematically compared. They also confirm "the inability of finance academicians and practitioners to demonstrate reliably that fund managers can consistently outperform market indices."

Latzko (1999) comes to the unequivocal conclusion, "There are scale economies in administering mutual funds." His findings are echoed by De Rooy (2006) and Freeman and Brown (2008). This notion of scale economies in mutual fund administration will play a key role in our discussion.

While the literature pertaining to 403(b) plans in particular is somewhat sparse, a number

Table 1 Mutual fund industry average fees

	401(k) participants	Mutual fund industry average
Stock funds	0.76%	0.91%
Bond funds	0.58%	0.71%

of recent studies help set the broader stage for this analysis. Deaves and others (Deaves, Veit, Bhandari, and Cheney, 2007) use survey data to analyze the savings and investing decisions of employees eligible for a college 403(b) plan. Pozek (2010) provides a nice comparison of 401(k) and 403(b) plans in the regulatory world after January 1, 2009. Finally, Friedman (2009) gives a good review of the regulations that now govern 403(b) plans and are driving some towards the consolidation of service providers.

3. Retirement plan services as a natural monopoly

Suppose tastes for retirement services among a firm's employees are homogenous. Let M symbolize the cost to market retirement services to the firm and m denote the cost to market retirement services to any single participant. There are n employees within the firm who desire retirement services and we shall assume the firm will spend more time in selecting a retirement services provider for its employees so that $M>m$. The cost of utilizing a single retirement service provider is the monopoly deadweight loss. This is sometimes observed in the industry when participants become disgruntled by the lack of timely response from the retirement service provider. Left to their own devices, some employees would fire that provider and select another. The fact that they cannot (because only their employer can) is a way to visualize the deadweight loss.

Conversely, the benefit of utilizing a single provider can be noted as:

$$m - \frac{M}{n}$$

This benefit is obviously increasing in n. Intuitively, the employees of larger employers have more to gain from the single provider framework than employees of smaller firms.

Empirical and anecdotal evidence suggests that the benefit of a single provider outweighs the cost in many cases, at least if we are willing to rather weakly assume that the homogenous goal of each participant is to maximize his or her future retirement plan balance. Table 1 shows Investment Company Institute data (Holden, 2006) demonstrating what 401(k) participants and mutual fund buyers in general typically pay as management fees.

A naïve asset allocation split perfectly between these asset classes would result in an average fee of 0.67% for 401(k) participants and 0.81% for general purchasers of mutual funds. Conversely, the data we examine in this essay show un-weighted mutual fund expense ratios ranging from 0.63% to 2.00% of assets, and this is before the levy of any additional 403(b) administrative fees. Simply put by one advisor in a recent industry publication that spoke of 403(b) plans, "Many of these nonprofit retirement plans have expensive funds" (Shidler, 2008).

What about the deadweight loss? Does it outweigh the fee savings afforded by the single provider arrangement? To posit an answer to this question, consider a version of the Tiebout hypothesis and assume now heterogeneous tastes in retirement plan services, but a continuum of firms competing in the labor market, each of whom has a different retirement plan provider and/or plan structure. Employees can self-select the employer offering the preferred provider/structure and thus render moot the deadweight loss issue.

4. Willingness to pay as a function of the tax code

Before we can proceed with our analysis, we should first ask a basic question: Why should a customer pay any incremental fee to participate in a 403(b) plan? Over one-half of the current 403(b) balances are invested in mutual funds (Investment Company Institute, 2008). Those that are instead invested in annuities often have mutual funds underlying those annuities. The mutual funds themselves can generally be purchased in an after-tax account. Why pay an extra fee to procure them within a 403(b) construct?[2] Stated alternatively and using the phrasing of Deaves and others (2007), suppose a saver with a high "propensity to plan" is eligible for a 403(b) plan that features no employer matching contribution. Why would said saver choose (and pay an extra fee for) the 403(b) savings vehicle rather than a standard taxable brokerage account through which to purchase a desired investment?

Mathematically and intuitively the answer lies within the Internal Revenue Code which gives tax advantaged status to 403(b) plans. Plan participants are not taxed on the amounts deferred into the plan, nor are they taxed on the investment income generated within the plan before funds are withdrawn. Barring premature withdrawal, participants simply pay ordinary income tax on the amounts withdrawn at retirement. The ability to defer taxes on both contributions and investment income afforded by the 403(b) plan leads, ceteris paribus, to a larger income stream in retirement.[3] In a standard marginalist construct, a 403(b) participant wishing to save a specified dollar amount for retirement would be willing to pay for 403(b) services up to the point at which the retirement annuity under the 403(b) arrangement is equal to that amount available under the after-tax arrangement. Alternatively stated, the participant is willing to pay for the value of the tax shelter in addition to the value of investment management services.

4.1. The simplest case

Suppose a saver surveys his own utility preferences, time discount factor, expected real rate of return, marginal tax bracket, and so forth, and determines that the present value of his lifetime expected utility will be maximized by saving C dollars annually during the working career for retirement. (We will assume away any liquidity preference for an after-tax arrangement that has no premature withdrawal penalty as does the 403(b) plan.) The participant will realize a real rate of return equal to r before the levy of any 403(b) administrative fee. This is the interest rate net of any management fees charged by the participant's selected funds. The marginal tax rate τ applies to the participant throughout the life course and the participant will withdraw the taxable amount FV at retirement that takes

place in t years. Finally assume that the participant pays administrative fee f that is sufficiently small so that $[(1 + r)/(1 + f)] - 1$ is approximately equal to $r - f$. The participant is indifferent between outcomes when the following two expressions are equal:

$$FV_{403(b)} = C(1 - \tau)\frac{(1 + r - f)^t - 1}{r - f} \tag{1}$$

$$FV_{after\ tax} = C(1 - \tau)\frac{(1 + r - \tau r)^t - 1}{r - \tau t} \tag{2}$$

The equality holds in this reductive, discrete time model when $f = \tau r$. The participant is willing to pay an administrative fee for 403(b) services up to the point at which the fee is equal to the product of the investment rate of return and the marginal tax rate.

Now it is clear that any of these assumptions can be questioned as being too strong. Arguably, the one most susceptible to critique is the implicit assumption that the participant's account balance is to be withdrawn fully at the date of retirement. Given the marginal nature of tax brackets, this would hardly be a welfare optimizing strategy unless one's life expectancy were sufficiently short that little needed to be saved, and thus withdrawn, to support one's brief retirement life. Otherwise, one would forfeit a greater amount of the retirement savings to the government upon withdrawal than necessary. Stronger medicine is needed to tackle the problem when a more realistic assumption is imposed. For mathematical convenience, we turn to continuous time for our next model.

4.2. Comparative static analysis in continuous time

Use the same variables as above and define R as the number of years until retirement at age 65 and D as the number of years from retirement to death. Then we can express a future value at the retirement age of 65 to be:

$$V_{65} = C\int_0^R e^{rt}\,dt \tag{3}$$

Alternatively, we could work backwards from death to retirement and find the present value of the retirement annuity *PMT* at age 65 to be:

$$V_{65} = PMT\int_0^D e^{-rt}\,dt \tag{4}$$

From Eqs. (3) and (4) it naturally follows that:

$$PMT = C\frac{\int_0^R e^{rt}\,dt}{\int_0^D e^{-rt}\,dt} \tag{5}$$

Now take this general formula and make it specific to the constructs of after tax versus 403(b) arrangements so that:

$$PMT_{after\ tax} = C(1-\tau)\frac{\int_0^R e^{r(1-\tau)t}\,dt}{\int_0^D e^{-r(1-\tau)t}\,dt} \tag{6}$$

$$PMT_{403(b)} = \frac{C}{(1-\tau)}\frac{\int_0^R e^{(r-f)t}\,dt}{\int_0^D e^{-rt}\,dt} \tag{7}$$

The astute reader will observe embedded within Eq. (7) an implicit assumption of no administrative fees following retirement. This is an attempt to mirror the commonly observed practice of rolling one's retirement savings into the relatively ubiquitous IRA at retirement. We will assume no administrative fees associated with this IRA account that would add on to the normal investment management fee.[4]

Equating (6) and (7) yields an equation not easily solved for f. but we can rearrange as follows and let:

$$F = (1-\tau)^2\int_0^R e^{r(1-\tau)t}\,dt\int_0^D e^{-rt}\,dt - \int_0^D e^{-r(1-\tau)t}\,dt\int_0^R e^{(r-f)t}\,dt \tag{8}$$

Using the implicit function Theorem and Liebniz's rule, we find:

$$\frac{\partial f}{\partial \tau} = -\frac{-[2(1-\tau)]\int_0^R e^{r(1-\tau)}\,dt\int_0^D e^{-rt}\,dt - (1-\tau)^2\int_0^R rte^{r(1-\tau)t}\,dt}{\int_0^D e^{-rt}\,dt - \int_0^D rte^{-r(1-\tau)t}\,dt\int_0^R e^{(r-f)t}\,dt} \tag{9}$$

$$\int_0^R te^{(r-f)t}\,dt\int_0^D e^{-r(1-\tau)}\,dt$$

The algebraic sign of this equation is positive if we are willing to make the weak assumption of a positive expected rate of return. This confirms the intuition that a participant's willingness to pay an administrative fee for a 403(b) plan is increasing in the participant's marginal tax bracket.

Interestingly, we cannot make such generalizations concerning other variables which help determine a participant's willingness to pay. Consider the effect on one's expected retirement longevity on willingness to pay.

$$\frac{\partial f}{\partial D} = -\frac{(1-\tau)^2 \int_0^R e^{r(1-\tau)t}\,dt\; e^{-rD} - e^{-r(1-\tau)D} \int_0^R e^{(r-f)t}\,dt}{\int_0^R te^{(r-f)t}\,dt \int_0^D e^{-r(1-\tau)t}\,dt} \tag{10}$$

The algebraic sign of this expression is ambiguous because we see a difference in two positive expressions in the numerator. Thus we cannot make a blanket assumption that a participant with a longer life expectancy after retirement will automatically be willing to pay more for 403(b) administrative services than an otherwise similarly situated participant with a shorter life expectancy.

Similarly:

$$\frac{\partial f}{\partial R} = \frac{e^{(r-f)R} \int_0^D e^{-r(1-\tau)t}\,dt - (1-\tau)^2 e^{r(1-\tau)R} \int_0^D e^{-rt}\,dt}{\int_0^R te^{(r-f)t}\,dt \int_0^D e^{-r(1-\tau)}\,dt} \tag{11}$$

$$\frac{\partial f}{\partial r} =$$

$$-\frac{(1-\tau)^2 \int_0^R (1-\tau)te^{r(1-\tau)t}\,dt \int_0^D e^{-rt}\,dt - (1-\tau)^2 \int_0^R e^{r(1-\tau)t}\,dt}{\int_0^D te^{-rt}\,dt + \int_0^D (1-\tau)te^{-r(1-\tau)t}\,dt \int_0^R e^{(r-f)t}\,dt - \int_0^D e^{-r(1-\tau)t}\,dt \int_0^R te^{(r-f)t}\,dt}{\int_0^R te^{(r-f)t}\,dt \int_0^D e^{-r(1-\tau)t}\,dt} \tag{12}$$

The algebraic signs of these expressions are likewise ambiguous and we can make no general assumption about how a participant's planned duration to retirement or expected rate of return on retirement savings will impact willingness to pay. These issues become empirical and we now turn to numerical analysis.

5. Numerical analysis

5.1. Baseline assumptions

We begin with the assumption that there is no significant difference in 401(k) versus 403(b) eligible workforces. In other words, employees who elect to work for a governmental or other nonprofit entity will have similar retirement ages, life expectancies, intertemporal elasticities of substitution and availability of other retirement benefits as their counterparts in the for-profit sector. While seemingly innocuous, we should note that this assumption is not without its potential issues. On the one hand, governmental employers sponsoring 403(b) plans may be more likely than for-profit entities to sponsor a defined benefit pension plan and this would, ceteris paribus, reduce the amount that their participants would wish to contribute to the 403(b) plan. Conversely, some 403(b) plan sponsors might opt out of Social Security which would likely have the opposite effect. However, the convenience of the assumption is that we can use a national database with readily available data. For this study, we shall use the 2005 wave of the Panel Study of Income Dynamics, using data for the 8,002 Heads of Household in the study and consider our final subset of this sample as representative of the 403(b) market.

We restrict the ages of these household heads to those under age 64. The data seems to indicate a significant number of people above age 63 have already retired. We will otherwise assume a standard retirement age of 65. The very abbreviated time span to anticipated retirement for a worker at least 64 years old would intuitively dampen demand for 403(b) administrative services and we will assume that 64 and 65 year old participants who are still in the workforce will put their savings in a more liquid account in anticipation of a more immediate need than younger participants.[5] That which we are implicitly assuming in the instant case is that the designated retirement savings of one's last year or two of gainful employment will be invested in an account that can be immediately accessed to provide retirement income for the interim period between one's last paycheck and liquid access to one's retirement account assets. The lag between the two dates can vary widely but is generally caused by various administrative necessities arising from compliance with the set of tax laws governing retirement plans.

Conversely, we establish no lower age boundary. This is in a theoretical sense elegant because with the assumption of a positive expected rate of return, those dollars deferred earliest in one's career have the highest expected future value. In praxis, however, little would be lost by excluding those under 21. PSID data shows only 113 heads of households who are under 21.

Our next data modification is to eliminate 57 observations where taxable income is reported as being less than labor income. One might conjecture that those thus reporting are doing some sort of mental accounting for the deductions they will use in tax calculations, and that would skew our results as we shall estimate their deductions for them to assign an income tax bracket. Of course, we shall keep the considerable number of observations where taxable income is reported as being greater than labor income. This result is expected for all survey participants who enjoy some sort of business or investment income. In these cases,

we shall use taxable income as the starting point for assigning a marginal tax bracket and we shall, following legal guidelines, use labor income as the source for 403(b) deferral contributions.

Our next task is to assign each participant a filing status. We shall here simply assume that participants who report themselves as Married will elect to file as Married Filing Jointly.[6] Participants reporting themselves as not married and having no dependent children are assigned a Single filing status. Finally, those participants reporting that they are not married but do have children in their households under age 17 or younger are assigned a Head of Household filing status.

Significant data deletions begin to occur as we eliminate survey participants whose taxable income is below the status thresholds at which they would begin to realize a tax liability. The taxable income thresholds are those that held in 2004 because the 2005 PSID wave reports 2004 income. Those thresholds are $7,950, $10,250, and $15,900 for Single, Head of Household, and Married Filing Jointly, respectively. In essence, we are saying that because these participants face a 0% marginal tax bracket (at least at the immediate margin that we are examining) they would have no demand for 403(b) administrative services since an after-tax savings scheme would weakly dominate any tax-advantaged arrangement. Obviously, we would observe the after-tax strategy strictly dominating the 403(b) strategy for this category of participants if, ceteris paribus, the participants had some sort of liquidity preference that we here have assumed away.

We finally delete observations for survey participants living outside the United States as we do not know whether or not they remain subject to United States tax law. After all deletions, 5,442 observations remain in our sample.

5.2. Methodology of calculation of willingness to pay

We begin our analysis by assigning each participant a marginal federal income tax bracket. The tax data are taken from the 2004 IRS From 1040. We make the assumption that each participant elects their standard deduction rather than itemizing deductions. The standard deduction is then augmented by $3,100 multiplied by the number of exemptions the participant can claim based on assigned filing status and the number of children reported. The difference between what the participant has reported as taxable income and the sum of deductions and exemptions represents the taxable income from which we assign marginal federal tax brackets.

The assignment of a state income tax rate proves a bit more tedious. To make the model tractable, we will assume that one's taxable income at the Federal level proxies one's taxable income at the State level. While this holds perfectly true for some states (like New Mexico) it does not hold perfectly true for others (like New York). Income brackets and marginal tax rates for each state are taken from Bankrate.com.

Our next step is to randomly assign an annual contribution amount that the participant wishes to save for retirement. It is assigned in real terms under the assumption that such real contribution will remain constant throughout the working career. To that end, each participant is randomly assigned a percentage of labor income that he or she wishes to save. The

percentage is drawn from a normal distribution with a mean of 7% and standard deviation of 4% if the participant meets the compensation criteria to be a nonhighly compensated employee. Otherwise, the percentage is drawn from a normal distribution with a mean of 6% and a standard deviation of 3%. These metrics represent the author's calculation from the data presented in Holden and VanDerhei (2001). The resulting dollar amount is capped at $14,000 that was the legal maximum allowable deferral in 2005.[7] A floor of $60 per year is established as the minimum amount a participant would be allowed to save.

Similarly, each participant is stochastically assigned an expected real rate of return drawn from a normal distribution with a mean of 5% and a standard deviation of 1%. Defining the boundaries for this expected rate is not without theoretical difficulties, but it is important to note the emphasis on expectations. It seems reasonable to assume that on an ex ante basis, investors will anticipate some positive and historically defensible real rate of return on their investments. Given the mathematical properties of the normal distribution, we are endowing virtually all of our participants with an anticipated average real rate of return between 2% and 8%. The lower bound would represent cautious investors who hedge against inflation with an investment like TIPS and hope for no more than a minimal return on investment. The upper bound represents aggressive investors who hope to capture the historical risk/equity premium of the stock market (Seigel, 2002.) Most investors, of course, will fall between these two extremes, and our model proceeds accordingly.

Given these data and an estimated retirement age of 65, we calculate a future value of savings in an after-tax arrangement for each participant. Both the contribution amount and the real rate of return are adjusted for taxes. Thus our formula is:

$$V_{65\ after\ tax} = C(1-\tau)\frac{\{1+r(1-\tau)\}^R - 1}{r(1-\tau)} \tag{12}$$

Then, using a randomly assigned postretirement life expectancy D taken from a normal distribution with a mean of 17.7 and a standard deviation of 8.6 years,[8] we calculate the resulting after-tax annuity that would be enjoyed during the retirement years for each participant. Our formula here is:

$$Annuity_{after\ tax} = V_{65\ after\ tax}\frac{r(1-\tau)}{1-\frac{1}{[1+r(1-\tau)]^D}} \tag{13}$$

This after-tax annuity amount serves as the baseline in our computation of a participant's willingness to pay a fee for 403(b) services that afford a desirable tax shelter.

We then calculate the equivalent IRA rollover annuity required to match the after-tax amount by simply dividing the latter figure by the quantity (1-marginal tax rate). The rationale here is that the amount saved via a 403(b) construct and rolled over into an IRA at retirement will cease to be tax deferred as the participant withdraws from the IRA to fund retirement consumption. The IRA annuity amount is then brought back to a Present Value (at age 65) discounted at the (unreduced) real expected rate of return originally assigned the participant using the formula:

Table 2

Average willingness to pay	2.64%
Standard deviation	0.03%
Minimum	2.55%
Maximum	2.73%

$$V_{65\ tax\ advantaged} = Annuity_{tax\ advantaged} \frac{1 - \frac{1}{(1+r)^D}}{r} \tag{14}$$

We then compute the real rate of return required to transform the annual preretirement contribution into the value at age 65 computed above. That rate r is calculated in Excel and solves the formula:

$$V_{65\ tax\ advantaged} = C \frac{(1+r)^R - 1}{r} \tag{15}$$

The difference in our calculated rate r and our originally assigned real rate of return represents the participant's willingness to pay for 403(b) services necessary to enjoy the tax advantaged status of that retirement savings arrangement.

6. Results

The random assignment of a real rate of return and a life expectancy after retirement and the resulting calculation of willingness to pay is performed in Microsoft Excel and repeated 1,000 times for our sample data from the PSID. The results of the simulations are reported in Table 2.

These results must be interpreted in light of their aggregate nature. Each of the 1,000 iterations is calculating the average willingness to pay for those in the sample of 5,442 participants. At the individual level, the difference in willingness to pay is staggering, ranging from a minimal 21 basis points to extreme figures of around 40%. The lower observations are intuitively observed for workers in low tax brackets who have little to gain from the tax shelter. Less intuitive are the figures on the upper extreme. They are observed for older workers in high tax brackets who have long life expectancies and, as such, have much to gain from a temporal tax shelter. Because they are compounded over such a short period of time until retirement, the high fees have less of a diminishing effect on future retirement balance than they would for an otherwise similarly situated younger worker.

6.1. Comparison to industry data

The final, and perhaps most interesting, question that we address is asking how our computed willingness to pay metrics compare to actual fee schedules observable in the 403(b) industry. The task is not quite as straightforward as we would observe in a perfectly

Table 3 Fee schedules

	Provider 1	Provider 2	Provider 3	Provider 4	Provider 5
Unweighted average expense ratio	0.760%	0.625%	2.000%	1.990%	2.000%
Separate account charge	0.000%	0.000%	1.25%	0.000%	0.000%
Total annual fee	**0.760%**	**0.625%**	**3.25%**	**1.990%**	**2.000%**
Front load	4.625%	N/A	N/A	N/A	N/A
Back load:					
Year 1	N/A	N/A	5%	8%	8%
Year 2	N/A	N/A	5%	8%	8%
Year 3	N/A	N/A	5%	8%	6%
Year 4	N/A	N/A	5%	8%	6%
Year 5	N/A	N/A	4%	8%	5%
Year 6	N/A	N/A	4%	4%	4%
Year 7	N/A	N/A	3%	4%	3%
Year 8	N/A	N/A	3%	4%	2%
Year 9	N/A	N/A	2%	4%	1%
Year 10	N/A	N/A	2%	4%	0%
Year 11+	N/A	N/A	0%	0%	0%

competitive industry. Table 3 shows the fee schedules of five significant providers of 403(b) retirement services.[9]

One immediately notes the striking disparities in these fees that bespeak an imperfectly competitive industry. The first two providers are major mutual funds. The services of Provider 1 are marketed primarily through brokers who are compensated by means of the front load. Provider 2 primarily markets through advertising and serves largely as an order taker to 403(b) participants who seek them out and who require little, if any, assistance in selecting investments. As anticipated, their fee structure seems to reflect significantly lower delivery costs. The remaining products are marketed by means of brokers or other sales agents. However, even among these three similar providers, the difference in fee level can be very significant.

Putting these fee levels on equal footing requires a set of assumptions that is forthcoming in another essay. For simplicity here, let us ignore Provider 1's fee schedule with its problematic front load and assume that the back loads of the other providers will not be triggered,[10] leaving us with only the expense ratios and separate account charges to consider.

We first note that the fee schedule of Provider 2 is strikingly similar to the previously reported expense ratio of 0.67% typically experienced by 401(k) participants.[11] This result is intuitively appealing given the nature of Provider 2's low cost strategy. Thus, we see that 403(b) participants have been able historically to seek out provider(s) whose fees rival those experienced by 401(k) participants. The secret lies in the participants having or acquiring enough human capital, time and interest to be able to seek out such providers and then unilaterally direct their own investment of their retirement savings.

An altogether different outcome obtains for those participants who wait for a provider to come to them, or who seek out the services of a more hands-on service provider. The fee schedules are between 1.18% and 2.19% higher than the un-weighted expense ratios of the average mutual fund investor as reported in Table 1. Based on our calculation of average willingness to pay, these providers are able to extract from participants a very substantial

portion of the participants' average willingness to pay for the tax shelter afforded by the 403(b) plan.

7. Conclusion

Pre-2009 403(b) regulations afforded great flexibility to 403(b) savers in selecting a retirement service provider in line with their personal preferences. However, that flexibility has come with a high price tag for some participants, arguably from those with the least knowledge of, or interest in, the financial markets. Herein we estimated that 403(b) savers would be willing to pay an average 403(b) administrative fee in an amount between 2% and 3% of account balance. It follows that some participants have enjoyed a great deal of consumer surplus afforded by the 403(b) tax break by selecting providers with limited service and low fees. However, those providers with a greater service offering and with proactive marketing efforts have charged significantly higher fees, extracting the bulk of the average consumer surplus that would otherwise be enjoyed by 403(b) savers. For average participants patronizing these providers, the 403(b) tax break has provided little or perhaps even no true augmentation to their future well-being. The intended benefit has either been diminished or erased by the high costs of marketing these plans individually or it has been largely extracted by the providers and captured by them as producer surplus.

Such an outcome hardly comports with the assumed spirit of the law or with the notion of economic efficiency. Thus the passage of the Pension Protection Act whose post-December 31, 2008 provisions make 403(b) plans more functionally akin to 401(k) plans seems to have either intended or hidden efficiencies, at least for a subset of 403(b) participants. The fee impact of the Pension Protection Act is explored in a forthcoming essay.

Notes

1 See Gottlieb (2007) for a list of the largest providers in the legacy 403(b) market.
2 One can ask the same question regarding 401(k) administrative fees and, indeed, much of the following analysis holds generally true for 403(b), 401(k), and 457 plans.
3 In life, of course, not all else is constant. The conventional assumption is that one's marginal tax rate will either remain constant or fall after retirement. One could easily envision a counterexample (i.e., preretirement tax rate = 0%, postretirement tax rate = 100%) where the 403(b) arrangement would lead to a welfare loss in comparison to an after-tax savings plan. The envisioning of more moderate versions of this counterexample might account for the popularity of Roth arrangements. In this essay, we proceed under the assumption that the expected marginal tax rate remains constant through the life course.
4 One might question why the aspiring retiree did not simply contribute to the lower fee IRA in the first place. Several reasons may exist, including the possible presence of an employer contribution afforded by the 403(b) and the higher contribution limits enjoyed by 403(b) participants. In 2004, for instance, the standard IRA limit was only $3,000 compared to the 403(b) limit of $13,000.

5 With the baby-boomer generation entering the retirement phase, it is foreseeable that there will be an increasingly pressing need for research on exit strategies from defined contribution plans. In similar spirit is begged the question of the optimal timing to cease the funding of one's retirement plan in favor of more liquid alternatives.
6 The filing status of Married Filing Separately is ignored with little loss. The 2006 tax filing data indicates that the number of Married Filing Jointly exceeds the number of Married Filing Separately by a multiplier of more than 21 (Herman, 2008).
7 Our assumption is that a participant in 2005 is operating under the 403(b) rules pertaining to 2005 but is using their computed marginal tax rate from their 2004 tax return to guide their decisions. We also restrict the annual contribution limit to the standard amount, ignoring the potential catch-up contributions afforded in some cases to older participants.
8 Author's calculation from data in the Human Mortality Database (2010). A minimum life expectancy of one year is assigned to each participant. Any rational participant not expecting to live beyond retirement age would, presumably, not save for it.
9 I am grateful to Gallagher Retirement Services for providing this data on fees.
10 Each provider has unique caveats which allow the back loads to be waived in certain cases. In each case, however, backloads are never triggered if the participant simply leaves the investment in the original account for the requisite period. We are implicitly assuming here this buy and hold strategy that minimizes fees.
11 Actually, the fee outcome of the 403(b) participants here is likely better than that of their average 401(k) counterpart. The .67% reported above accounts only for the fund management fee. 401(k) administrative expenses would be added on top of the management fee making the 401(k) fee even higher.

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