Using Behavioral Economics to Improve Diversification in 401(k) Plans: Solving the Company Stock Problem

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Investors in 401(k) plans often have very naïve notions of diversification. For example, in past research we have found that some employees use a simple "1/n rule": if there are five investment funds, they invest 20 percent in each fund regardless of its risk and return profile.[1] This strategy can lead to poor diversification if the funds in the plan are mostly of one type.

When company stock is one of the options in a 401(k) plan then even more serious diversification problems can occur. As the recent Enron experience has highlighted, employees with large company stock holdings in their 401(k) plan can discover that they have lost much of their retirement wealth at the very time that they are also losing their job. Even in less drastic circumstances, concentrating a large portion of retirement savings on a single stock is a risky strategy.

Many plan sponsors are now reconsidering the advisability of employees concentrating their retirement savings in the company stock. They are doing so because they are concerned about their employees welfare, and/or because they are concerned about legal risk. Class action suits by employees who were heavily invested in company stock are an unwelcome prospect.

For plans that currently have large holdings of company stock, and want to do something about it, questions arise about how to encourage employees to achieve better diversification without disrupting the market for the company stock by having everyone sell simultaneously. We have devised a method to deal with these problems using the tools of behavioral economics. The basic strategy we use is to incorporate our knowledge of the psychology of decision making to devise a behavioral prescription; the prescription gently nudges employees in the right direction.

In devising our prescription, we have used what we have learned from another attempt to solve a problem in this domain, namely low savings rates. Our prescription for low savings rates is called "Save More Tomorrow"[2]. To devise the prescription, we first diagnosed the problem of why people save too little. We found that many employees admit that their savings rates are inadequate, and think they should increase them, but

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[1] For discussion and evidence see Benartzi, Shlomo, and Richard H. Thaler, "Naive Diversification Strategies in Retirement Saving Plans," *American Economic Review*, March 2001, Vol. 91.1, pp. 79-98.

[2] More information on the Save More Tomorrow program is available at http://www.anderson.ucla.edu/faculty/shlomo.benartzi/savemore.htm.

have trouble following through on those good intentions. Reasons why they do not follow through include procrastination, inertia, lack of self-control, and an unwillingness to reduce their current take-home pay.

The behavioral prescription is straightforward: allow employees to commit themselves in advance to automatically increase their saving rate every time they get a pay raise. By committing themselves in advance to automatic increases, the self control problems are mitigated, and by linking the savings increases to pay raises, the employees never see their take home pay go down. The first company to adopt the Save More Tomorrow program managed to increase the average saving rate from 3.5 percent to 11.6 percent within two and half years.

For the problem of excessive investment in company stock, we again begin with a diagnosis. How did employees in some firms end up with very high exposures to company stock? In some cases, plan sponsors have essentially forced some company stock on the workers by paying the match in company stock, but it is important to stress that extreme allocations to company stock are often driven by participant behavior as well as plan restrictions. For instance, Enron officials argue that 89 percent of the Enron stock in the plan was attributed to employees' own choices.[3] Similarly, Coca Cola employees have more than 80 percent of their plan assets in Coca Cola stock, and half of this amount is actually attributed to employees' own choices.[4]

What are the behavioral factors that induce employees to load up on company stock? One factor is people's tendency to be overconfident and excessively optimistic. For instance, over 90 percent of all drivers consider themselves to be above average drivers, and more generally, people think that they (and their friends, co-workers, and children) are above average on many traits. In keeping with this tendency, people believe that they work for above average companies whose stock is a good investment. Nine out of ten plan participants believe that their company stock is at least as safe as a diversified fund with many different stocks.[5] And, there is some evidence that plan participants still feel that company stock is safe, despite being well aware of the Enron case.[6] In the case of company stock, overconfidence could also be exacerbated by a "familiarity bias". When we know more about a company, we are more comfortable investing it that company, even if we have no real private information that would provide an investment advantage.

Another behavioral factor deserving attention is inertia. The role of inertia in participant behavior is best illustrated with automatic enrollment plans, where employees are defaulted into the plan unless they explicitly opt out. In one plan studied by Madrian and Shea, participation rate for newly eligible employees increased from 49 percent to 86

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[3] "Employees' Retirement Plan Is a Victim as Enron Tumbles," *The N.Y. Time*s, Nov. 22, 2001.

[4] Based on the 11-k filing for the fiscal year ended Dec. 31, 2000.

[5] See Benartzi, Shlomo, "Excessive Extrapolation and the Allocation of 401(k) Accounts to Company Stock?" *Journal of Finance*, October 2001, Vol. 56.5, pp. 1747-1764, and John Hancock Financial Services, 1999, "The Sixth Defined Contribution Plan Survey."

[6] See "Enron Has Little Effect on 401(k) Participants' View of Company Stock", *Boston Research Group*, April 25, 2002.

percent.[7] Similarly, they find that once people are defaulted into a money market fund, they are unlikely to take an action and reallocate their portfolio.

In the case of company stock, inertia suggests that once employees are invested in company stock, they are unlikely to take an action and sell it. This is especially true when the stock price doubles and triples, because employees might think that they are on the "right track." Of course, this is exactly the situation where an action is most needed, since outstanding stock performance increases the allocation to company stock beyond the original target of the participant. Given the power of inertia, a program that attempts to increase diversification has to make it technically and emotionally easy to take action; otherwise, the status quo bias will prevail.

The final problem is a lack of understanding of basis statistics and the power of diversification. Many investors fail to realize that the investment performance of a single stock is much riskier than that of a diversified portfolio. This lack of understanding can leave workers failing to realize that there is a problem to be solved.

The program we have developed has two key ingredients. The first goal is to inform employees about the benefits of diversification. First, we propose that the risk and return profile of investing in a single stock be shown in simple plain English. One method of doing this is to make calculations of projected retirement income flows in various scenarios. For instance, an independent advisor could be hired to calculate the level and range of retirement income each employee could expect at retirement if investing in either company stock or a diversified portfolio. Table 1 illustrates this type of calculations for a hypothetical employee at Coca Cola. Calculations were done using Financial Engines software.

As Table 1 illustrates, the projected median income typically doubles as an employee switches from a concentrated portfolio with a single stock to a diversified portfolio. This might come as a surprise to some plan sponsors who believe that Coca Cola stock should, on average, do as well as the S&P 500 index. Indeed, there is no reason to believe that a particular member of the S&P 500 index will, on average, do much better or much worst than the index. However, the so-called average is deceiving when dealing with individual stocks, because a few stocks tend to outperform the index by very large margin, whereas most stocks actually lag the index. This is exactly what Table 1 illustrates and what needs to be communicated to plan participants. We believe that illustrating the risk and return of company stock in terms of its implications for retirement income could minimize optimism and overconfidence.[8]

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[7] Madrian, Brigitte C., and Dennis F. Shea, 2001, "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior," *Quarterly Journal of Economics* (forthcoming).

[8] Our approach is very different from the common practice of describing company stock as an appropriate investment for "investors who are aware of the risk of investing in a fund that depends solely on the performance of one company" where optimism and overconfidence create unrealistic expectations.

TABLE 1: PROJECTED RETIREMENT INCOME

	Investing in the S&P 500 Index	Investing in Coca Cola Stock
Upside income	$137,000	$186,000
Median income	$40,900	$20,700
Downside income	$12,800	$3,660

Assumptions: a 30 year's old employee, planning to retire at age 65, earning $50,000, and saving 10 percent of pay. Source: *Financial Engines*.

So far we have discussed the educational portion of the plan, designed to reduce participant's overconfidence and lack of statistical expertise. If this is successful, the plan next has to overcome the power of inertia, and the reluctance of investors to take drastic actions. Many investors will not like the idea of selling off most of their shares of the company stock at once, fearing regret if the price then shoots up. To deal with this problem we recommend two steps. First, a target level of investment in the company stock is selected. Generally, this will not be zero. By allocation a small portion of the portfolio to company stock (say 10%), the employer can still make the employees feel that they are part owners of the firm, at a fraction of the risk associated with much large holdings. Also, by retaining some holdings in the company stock, the employee reduces subsequent regret if the stock performs well.

The second step is to establish a gradual process of selling company stock shares to invest in other diversified assets. This the Sell More Tomorrow feature. The specific details can be varied according to the particular situation, but for the purposes of illustration consider the following example. In a company where employees have an average of 75% of their assets invested in company stock, they are told that a portion of their holdings will be sold off each month, until they reach their new desired goal of a 15% investment in company stock after two years.

The Sell More Tomorrow program is not limited to company stock. In fact, it could be used to increase diversification in general. For instance, consider the late 90's when plan participants were thriving for Internet funds. The same approach of showing projected retirement income from a diversified portfolio versus an Internet fund could have been used to illustrate the risk of investing in a single sector. The Sell More Tomorrow program could also be combined with the Save More Tomorrow program to achieve increased diversification and savings. A sample employee brochure covering the two programs is included in the Appendix.

In summary, we believe that the Sell More Tomorrow program could increase employee diversification at minimal disruption to the market for the company stock. In addition, the program could provide employers with legal protection, since it highlights the risk and return profile of company stock and offers an opportunity to diversify. It is thus a win-win for employees and employers alike.

If you would like to learn more about the program, feel free to contact Professor Benartzi by phone (310) 206-9939 or email Shlomo.Benartzi@anderson.ucla.edu. We will gladly assist the first few employers implementing it at no charge as long as the data could be used for research purposes.

Appendix: Sample Employee Brochure

Dear XYZ employee,

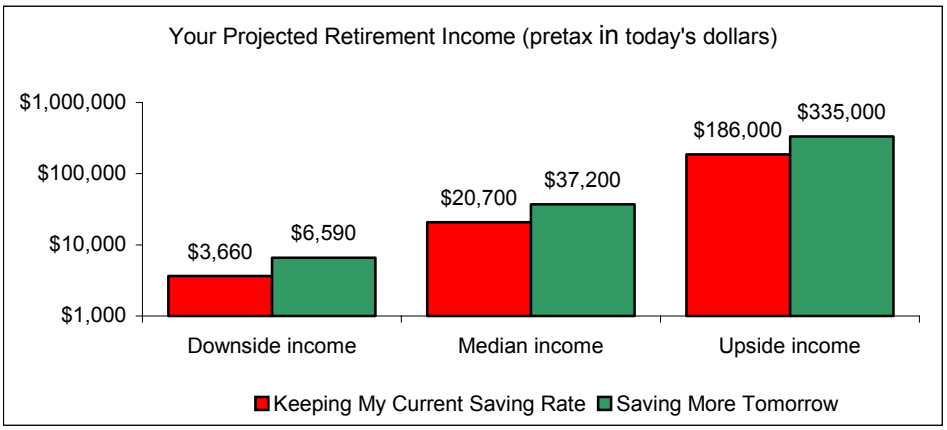
Are you concerned about your retirement savings?

In light of the Enron bankruptcy and the increasing volatility of the stock market, we have received many inquiries from our employees about the role of XYZ stock in the Investment Plan. Some employees have told us that they are concerned they will not have sufficient funds at retirement. Others are wondering whether they have taken too much risk. We would like to use this opportunity and address those concerns.

Would you like more information?

In order to provide you with useful information about your financial future, we have hired an independent advisor to calculate your projected income at retirement. Since we don't know much about your social security benefits or other financial resources, the projections relate to your XYZ Investment Plan only.

Here is detailed information about your projected retirement income.



Let us help you understand the graph.

As you can see from the red bars, your projected retirement income is $20,700 per year (pretax in today's dollars). This means that half the time your income will be greater than $20,700 and half the time it will be less than $20,700, depending on the state of the economy and market conditions. The red bars also illustrate that you could expect your retirement income to be somewhere between $3,660 and $186,000.*

Let's see what would happen if you save more.

We also calculated what your retirement income would be if you increase your saving rate. In fact, we designed a special program, called Save More Tomorrow, which automatically increases your saving rate by two percent every year for the next five years. As you can see from the green bars, if you join the Save More Tomorrow program, your projected income would increase from $20,700 to $37,200.

Are you ready to save more tomorrow?

We hope that you will consider the Save More Tomorrow program. In fact, if you simply think about your financial future and fill the Save More Tomorrow reply card, you will enter a $10,000 lottery. You will actually enter the lottery regardless of your saving decision, and you could change your mind at any time.

Fill this form to enter a $10,000 lottery.

☐ No, I do not want to join the Save More Tomorrow program.

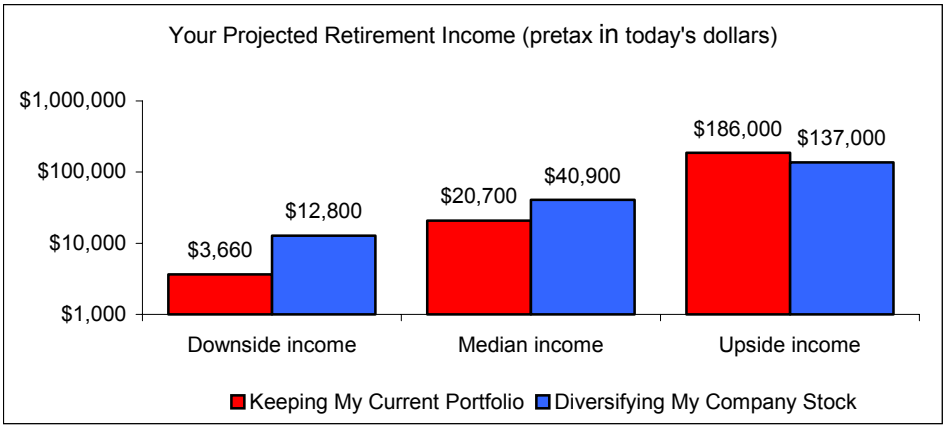
☐ Yes, I would like to join the Save More Tomorrow program and have my saving rate automatically increase by two percent every year for the next five years.

* In statistical terms, the likelihood of your retirement income being higher than $3,660 or lower than $186,000 is 10 percent.

Are you wondering whether you have taken too much risk?

We would also like to use this opportunity to discuss investment risk. If you are like most of the employees we have heard from, you are probably wondering whether you are taking too much risk. To give you more information about risk, we have asked the independent advisor to calculate how your retirement income might change if you choose a different portfolio.

Here is detailed information about your projected retirement income from different portfolios.



Let us help you understand the graph.

As you have already learned from the red bars on the previous page, your projected retirement income is $20,700 per year (pretax in today's dollars). This means that half the time your income will be greater than $20,700 and half the time it will be less than $20,700, depending on the state of the economy and market conditions. You might also remember that you could expect your retirement income to be somewhere between $3,660 and $186,000.

Let see what would happen if you diversify.

The advisor has calculated for you how your retirement income would change if you replace your XYZ holdings with a diversified fund consisting of many different stocks. As you can see from the blue bars, your projected retirement income would increase from $20,700 to $40,900. If you switch to the diversified fund, you could also expect your retirement income to end up somewhere between $12,800 and $137,000. These calculations illustrate that investing in a single stock is risky: while it provides more upside potential, it has more downside risk.

Are you ready to diversify?

We hope that the information we provided helps you determine whether investing in a single stock is too risky for you. And, if you are ready to diversify, but concerned that this is not the right time to sell the XYZ stock, we have designed a special program for you. The program is called Sell More Tomorrow, and if you join it, your XYZ holdings will automatically be converted into the S&P 500 Index in equal increments over the next 24 months.

Fill this form to enter a second $10,000 lottery.

Again, if you simply think about your financial future and fill the Sell More Tomorrow reply card, you will enter a second $10,000 lottery. You will actually enter the lottery regardless of your investment decision, and you could change your mind at any time.

☐ No, I do not want to sell my XYZ holdings.

☐ Yes, I would like to have my XYZ holdings converted to the S&P500 immediately.

☐ Yes, I would like to join the Sell More Tomorrow program and have my XYZ holdings automatically converted to the S&P500 over the next 24 months.