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Dimensions of 401(k) Plan Design

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Abstract

This paper explores why plan sponsors design their 401(k) plans the way they do. Employing a unique, rich dataset of over five hundred 401(k) plans, we find that these plans are principally a form of tax-motivated compensation under the restriction of federal non-discrimination rules. In other words, to appeal to better-paid workers, employers offer more generous monetary and non-monetary plan design features. At the same time, complex federal tax rules restrict pay discrimination in favor of the highly-paid employees.

Disciplines

Economics

Comments

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Chapter 10

Dimensions of 401(k) Plan Design

Olivia S. Mitchell, Stephen P. Utkus, and Tongxuan (Stella) Yang

Defined contribution (DC) plans today are at the core of the US retirement system, with over 60 million employees holding $2.4 trillion in DC plan assets.[1] The number of DC plan participants has also grown rapidly in the past two decades, at almost double the rate of labor force increase. Today it is estimated that employer-sponsored DC plans will provide larger retirement benefits than social security for the Baby Boom generation (Poterba et al. 2004). Prior research has explored how DC plan features shape employee saving behavior, particularly in the case of the popular 401(k) plan.[2] By contrast, in the present chapter, we focus on the question of how and why employers select their plan design features.

Our analysis seeks to evaluate various rationales provided to explain 401(k) plan design features. Some contend that employers utilize such plans to shape workforce characteristics—such as age, tenure, or even the male–female mix. Others argue that 401(k) plans are mainly a way to tax-defer compensation, albeit under complex rules. To highlight the relevant issues, we examine a rich new data-set of several hundred 401(k) plans covering more than 740,000 employees, containing unique detail on plan design features, workforce characteristics, and industry sectors. We are able to model employer matching contributions with exceptional precision, and we also incorporate important nonmonetary design features including the plan investment menu and the presence of loans which we argue reflect liquidity and investment constraints inherent in 401(k) plans.

We show that promised 401(k) matches vary from 0 to more than 6 percent of pay, and that the median employer *promises* a match equivalent to 3 percent of pay. We evaluate the factors which explain the wide variation in promised matches, acknowledging that this variation may be driven in part by the value assigned to compensation paid in the form of matching contributions, presumably influenced by workers' marginal propensity to save and marginal tax rates. As well, employers may intentionally direct a portion of their compensation budgets toward (or away from) workers with particular age, tenure, or other characteristics. The latter view has found support in prior research which shows that employee utilization of 401(k) plans is linked to workers' age, tenure, sex, and income levels. Our evidence shows that these plans appear to mainly be

tax motivated, constrained by federal nondiscrimination rules. In other words, to appeal to better-paid workers, employers offer more generous monetary and nonmonetary plan design features. At the same time, complex federal tax rules restrict pay discrimination in favor of the highly paid employees.

In what follows, we first briefly describe our methodology and data. Next we report our analysis of the determinants of employer plan design decisions. A final section offers conclusions and implications.

Hypothesis and Method

Prior studies have mainly focused on how the employees respond to 401(k) plan designs. Typically these analyses relate worker participation and contribution levels in 401(k) plans to employees' age, income, tenure, and other characteristics. A serious drawback of these studies is that they all treat employer matching contributions as exogenous, without asking why firms might offer matching contributions—and indeed, other plan features—in the first place. One explanation for the observed heterogeneity in 401(k) design could be that plan design represents a form of compensation motivated predominantly or exclusively by the tax deferral incentives offered under the federal tax code, about which we say more in the next section. Another possibility is that 401(k) plans, like other benefit programs, are used by employers to attract a workforce with specific characteristics.

US employers have substantial flexibility regarding the design of their retirement plans. Offering a retirement plan is voluntary, and most private-sector firms that offer an employer-sponsored retirement program today include a 401(k) plan. A key element in such a plan is that the *employee* must first contribute some portion of his salary to the plan—known as the employee's 'elective deferral' or 'salary deferral amount'—before he is entitled to any matching contribution. Employees are afforded substantial tax incentives under the law for saving within 401(k) plans. Thus employee contributions from current wages are tax-deductible (up to $10,500 in 2001, the year of our data set); employer matching contributions are exempt from current taxation; and all investment earnings on the pension account are compound tax-free until withdrawal (which is typically later in life, when tax rates may be lower). By contrast, employers realize no particular tax advantage from offering a 401(k) plan: a firm can generally deduct compensation paid in the form of taxable wages or contributions to a tax-qualified retirement plan.[3]

Under the hypothesis that a 401(k) plan is used mainly as a device for obtaining tax-advantaged compensation, several factors would be anticipated to play an important role in plan design. For example, a company paying higher average compensation would be expected to have a more generous match, because salary levels will lead workers to prefer

tax-deferred saving. The 401(k) plan will also be influenced by the availability of other forms of tax-advantaged compensation, such as some other defined benefit (DB) or DC retirement plan, in addition to the 401(k) plan. Larger plans are likely to be less expensive to operate, and thus benefit from economies of scale in plan administration. All of these considerations would also be shaped by the complex series of federal tax rules that govern such plans, including the rules of nondiscrimination testing about which we say more below.

An alternative view, widespread in the benefits-consulting community, is that 401(k) plans are designed to attract and retain workers according to desirable workforce traits such as age or tenure.[4] An elaboration on this view is offered by Ippolito (1997) who suggests that employers with DC plans use match rates along with deferred vesting to direct some portion of compensation to 'savers' who he concludes have lower quit rates and higher job performance ratings.[5] In such a situation, factors such as workers' compensation levels, age, tenure, and sex, as well as saving behavior within the 401(k) plan, might be important determinants of plan design and employee behaviors.

To assess these determinants of 401(k) plan design, we develop an empirical model of the employer's plan decision-making. Here employers are presumed to structure the *monetary* and *nonmonetary* features of their 401(k) plans so as to realize their plan design goals. For instance, if 401(k) plan design features were mainly driven by preferences for tax-motivated compensation among better-paid employees subject to applicable tax law constraints, we might anticipate a positive link between average compensation level and the generosity of the plan match rate. By contrast, if a firm wished to attract and retain a particularly stable workforce, plan features would be geared toward older, better-paid, and longer-tenured workers. This formulation, shown in Equation (1), thus proposes that key plan design features (PD_j,) are shaped by both labor and product market factors. These include workforce characteristics (EE_j), employer-level controls (ER_j), and indicators of how constraining tax rules might be (TAX_j):

$$PD_j = \beta_0 + \beta_1 \times ER_j + \beta_2 \times EE_j + \beta_3 \times TAX_j + \varepsilon_I. \tag{1}$$

The PD_j vector measures the presence and value of employer contribution matches as well as nonmonetary features that relate to the investment and liquidity constraints within 401(k) plans. Investment variables include how many investment funds are offered to participants; how concentrated fund investment menus are in equity funds; and whether the employer offers company stock in the plan as an investment choice. Features that reduce liquidity costs of 401(k) saving include the presence of after-tax contributions or loans. Employer-side controls include firm size, as a proxy for economies of scale, and industrial sector.

To the extent that firm-side factors drive design decisions, we would anticipate that the β_1 term would be nonzero. In addition, if design features are driven by the need to attract and retain a suitable workforce, we would expect β_2 to be nonzero. And finally, if a 401(k) plan's features are constrained by nondiscrimination or other limits, we would anticipate that the β_3 term would be nonzero.

Empirical Considerations in Nondiscrimination Testing

Analysis of 401(k) plan design is complex due to three issues: the unit of analysis, the complexity of plan design, and US tax rules governing retirement plans. Prior research has not always taken these important issues into account, yet they are of vital importance to understand plan design in the US context. To each we turn briefly.

Unit of Analysis. The 401(k) universe is highly skewed, meaning that statistical analysis will be quite sensitive to the level of aggregation used for analysis. For instance, in our sample (to be described in more detail later), the largest 3 percent of the plans account for half of all covered employees, and the largest 50 percent of plans account for 96 percent of covered employees.[6] Since we seek to explore plan design decisions at the firm level, the firm is the appropriate level of analysis. Of course, this means that this firm-level analysis will include many smaller and medium-sized firms. By contrast, employee-level analyses will be weighted toward plan features and behavior of larger firms, a point often overlooked when interpreting evidence on 401(k) plans.

Complexity of Plan Design. Few prior studies have dissected the interesting nonlinear and complex saving incentives inherent in 401(k) plan matching structures.[7] For instance, employer matches tend to be noncontinuous, bunching at particular values. Additionally, 401(k) plans contain many features that affect liquidity and investment constraints, including different investment menus and differential plan access to loans and after-tax contributions. The presence of other retirement plans will also likely to influence both saving and investment behavior within 401(k) plans, competing with 401(k) plans as a source of tax-deferred compensation, and in the case of employer- and government-guaranteed DB benefits, influencing risk-taking within the 401(k) plan. Studies which do not control on such factors will naturally find results which differ from the analysis to follow.

Tax Rules and Testing. Tax considerations play an essential role in determining 401(k) plan design and employee behavioral responses. Specifically, most forms of compensation in the USA are subject to

progressive income taxes; as noted, above, pension contributions are generally tax-deferred, but only as long as they satisfy a series of tax rules, most of which restrict allowable contributions. In particular, under *Section 402(g)* of the Internal Revenue Code (IRC), employees are limited as to the amount of current wages they can contribute to a 401(k) plan—in the year of our plan data, 2001, the limit was $10,500 per year. This rule effectively censors plan saving rates; for example, someone earning $150,000 in 2001 had a maximum possible plan saving rate of 7 percent ($10,500 divided by $150,000). Meanwhile, a person earning $1 million had a maximum possible plan saving rate of about 1 percent of pay.

US retirement plans are also subject to two types of *nondiscrimination rules*. One set is called the *general nondiscrimination rules*, requiring, among other details, that the 'rights, features and benefits' of a plan be allocated equitably across eligible participants. Under this rule, no plan may offer, for example a higher match to higher-paid employees or to employees based on managerial rank. A second set of rules, particularly important for 401(k) plans, is the so-called *nondiscrimination testing* (*NDT*) rules, for pretax 401(k) elective deferrals. Under these rules, an employer must divide its eligible plan participants into two groups: the highly compensated employees (HCEs, earning $85,000 or more in 2001) and the non-highly compensated employees (NHCEs, or those earning below $85,000 in 2001). In the most common situation, the plan contribution rate of the HCEs may not exceed that of the NHCEs by more than 2 percent.[8]

When calculating plan saving rates under NDT rules, however, an employer may only count income subject to the *Section 401(a)* definition of compensation, which is the maximum level of pay that can be considered for retirement plan purposes; it was $170,000 per year in 2001. Thus, an employee earning $1 million and contributing $10,500 may have an *actual plan contribution rate* of just over 1 percent ($10,500 divided by $1 million). However, his plan saving rate *for federal tax purposes* is defined as 6.18 percent ($10,500 divided by $170,000). In other words, in any given 401(k) plan, as the number of highly compensated employees earning more than $170,000 and contributing $10,500 increases, saving rates for the HCE group will converge toward 6.18 percent for federal tax purposes. As a result, to comply with nondiscrimination testing rests, the employer must encourage the NHCEs to save at least 4.18 percent of earnings (2 percent less than the HCE threshold of 6.18 percent). In addition, many plans will seek to boost NHCE saving rates above this level, because not all HCEs in the plan earn more than $170,000 annually, and not all HCEs will contribute the maximum $10,500 per year.[9]

Finally, two other rules constrain highly paid employee contributions and employer matches in 401(k) plans. Under *IRS Section 415*, total employee and employer contributions to any tax-deferred retirement plan cannot exceed 25 percent of pay or $35,000. For example, a worker earning

$40,000 in 2001 could only receive total employer and employee contributions of $10,000. In addition, a *15 percent limit for profit-sharing plans* also applies, since 401(k) plans are technically organized as profit-sharing plans under US law; as a result, they must generally limit employee and employer contributions to 15 percent of the firm's total wage bill. Consequently, depending on how many eligible participants actually join the plan and the amounts contributed, plan participants could be subject to a 15 percent (or occasionally higher) limit on the sum of employer and employee contributions.

Next, we turn to an examination of data-set used in the analysis and we quantify how many employees are subject to these different tax law constraints.

Description of 401(k) Plan Features

Our analysis of the determinants of plan design draws on a unique and rich set of administrative records for 507 401(k) plans, obtained from Vanguard for the 2001 plan year.[10] Each plan record includes information on important design features including the employer's match formula, features of the plan's investment menu, the presence of other retirement plans (such as a DB or other DC plan), and indicators of participant access to plan accumulations prior to retirement. We also gained access to records for the 740,000 employees in the firms offering these plans; these data included age, sex, job tenure, earnings, plan participation, plan contribution, and asset and contribution allocation information.[11]

401(k) Plan Design Features. Key attributes of the 401(k) plans in our sample appear in Table 10-1. The mean employer is a mid-sized firm with about 1,500 employees; some 82 percent offered a match for employee 401(k) plan contributions.[12] Matching formulas range from zero (18 percent of plans) to very generous matches of more than dollar-for-dollar on at least 6 percent of pay (2 percent of plans).

Our empirical tactic divides the nonlinear 401(k) match formula into an *incentive element*, reflecting how much the employee is rewarded per dollar contributed; and a *liquidity element*, indicating how much compensation the employee must 'tie up' in the 401(k) plan in order to receive the entire employer incentive payment. Accordingly *Match_f3* indicates the value of the employer's matching contribution on the first 3 percent of pay contributed by the employee (i.e. from 0 to 3 percent); *Match_n3* captures the rate on the next 3 percent of pay (i.e. from 4 to 6 percent of pay); and *Match_n2* reflects the value of the match on an additional 2 percent of pay (i.e. over 6 percent and up to 8 percent of pay). Another variable, *Contr4 MaxMatch*, captures how much the employee must contribute to receive the maximum subsidy from the employer. For

TABLE 10-1 Employer 401(k) Plan Design: Descriptive> Statistics (Plan Level)

Panel A. Employer match rates and other plan design features‘

	Variable name	*Mean*
Number of employees covered	Plan_size	1,460
Employer plan provides match for employee contributions	Positive_match	82%
Match rate on first 3% of compensation (0–3%) Match rate on next 3% of compensation (3–6%) Match rate on next 2% of compensation (6–8%)	Match_f3 Match_n3 Match_n2	$0.55 on $1 $0.37 on $1 $0.05 on $1
Match rates conditional on a match being offered: Match rate on first 3% of compensation (0–3%) Match rate on next 3% of compensation (3–6%) Match rate on next 2% of compensation (6–8%)		 $0.67 on $1 $0.49 on $1 $0.44 on $1
Promised employer match as % of pay	MaxCostErMatch	3.00%
Employee contribution required for maximum employer plan match (the ‘match cap’)	Contr4MaxMatch	4.90%
Number of funds offered in plan	NFundsOffered	12.6
Fraction of funds offered that are equity funds	Fund_stock	65%
Employer stock offered in plan	ER_stock	19%
Employer plan permits after-tax contributions	After_tax	24%
Employer plan offers loan	loan	85%

Panel B. Correlations among plan design features

	Match_f3	*Match_n3*	*Match_nn2*	*MaxCostE RMatch*	*After_tax*	*Nfunds*	*Fund_stock*	*ER_Stock*	*Loan*
Match_f3	1								
Match_n3	0.63	1							
Match_n2	0.10	0.27	1						
MaxCostE RMatch	0.34	0.56	0.56	1					
After_tax	0.19	0.18	−0.05	0.08	1				
Nfunds	0.00	0.04	0.01	−0.05	0.09	1			
Fund_stock	0.06	0.13	0.03	0.09	0.06	0.32	1		
ER_Stock	0.20	0.16	−0.01	0.09	0.32	0.12	0.06	1	
Loan	0.08	0.12	−0.01	0.12	0.07	0.08	0.18	0.09	1

Source: Authors’ calculations.

example, in a tiered formula that paid dollar-for-dollar up to 2 percent and 50 cents per dollar from 2 to 4 percent, the maximum required employee contribution is 4 percent. When calculating the maximum amount the employer promises in the form of matching contribution, we find that

about one-third of plans promise to provide below 3 percent of pay; about one-third, exactly 3 percent; and about one-third, more than 3 percent.[13] Panel A of Table 10-1 shows that the mean match by firms offering a match is 50 cents per dollar on the first 6 percent of employee contributions, as reported in prior studies (cf. Papke 1995). But we also find that employer match patterns are extremely *nonlinear*: the average firm matches an average of 55 cents per dollar the employee contributes on his first 3 percent of salary; 37 cents per dollar on his next 3 percent of pay; and only 5 cents per dollar for his next 2 percent of pay. There is also substantial variation in the so-called 'match cap' which is the amount the employee must deposit to obtain the largest possible employer subsidy: the mean is around 5 percent of pay, while the median is 6 percent. The nonlinearity of 401(k) matching contributions is captured in Figure 10-1, which summarizes the match rate and tier for 360 single-tier formulas in our sample.

These 507 plans also offer an average of 12.6 investment choices in their plan menus; 19 percent offer employer stock as an investment choice; and two-thirds of the investment options are equity funds. It is interesting to note that the majority, but not all, of the plans (85 percent) give employees access to their retirement accounts via a *loan feature*, which affords liquidity

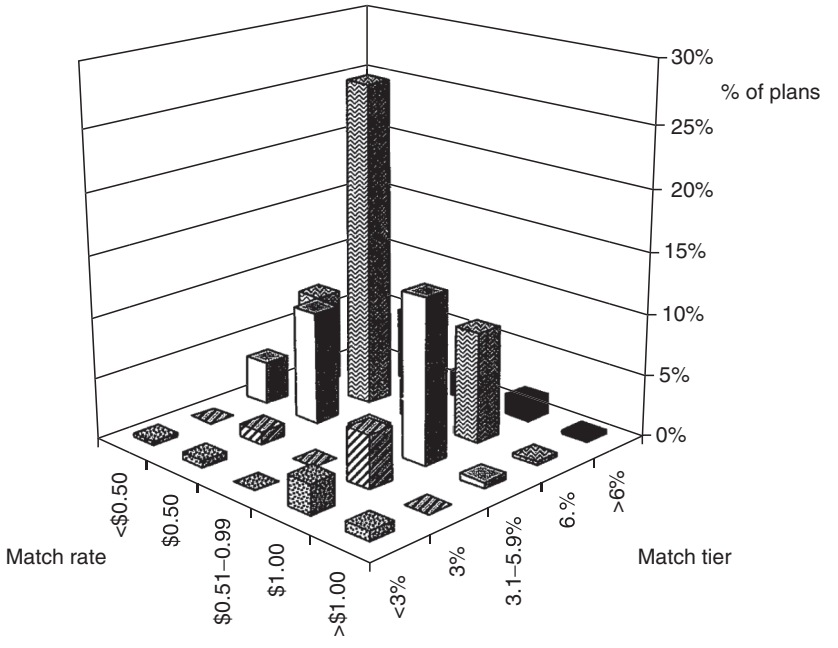

Figure 10-1. Distribution of employer match patterns in single-formula plans (360 plans).
Source: Authors' calculations.

often perceived to be particularly attractive to low-wage savers. A quarter of the plans permit *after-tax contributions*, which allow employees a way to gain preretirement access to a portion of their saving; they also offer a tax benefit, tax-deferred earnings, to those who reach pretax savings limits.[14]

Panel B of Table 10-1 shows the correlations among key plan design variables. We find that, in general, 401(k) plans are consistently generous in different design features. *Match_f3* is highly correlated *match_n3*, with the correlation coefficients at 0.63; the match cap, *Contr4MaxMatch*, is highly correlated at all levels of match (*Match_f3*, *match_n3*, and *match_n2*), with correlations at 0.34, 0.56, and 0.56 respectively. The high-correlation coefficients above indicate that generous employers not only provide higher match to every dollar that employees contribute to their 401(k) account, but also match up to a higher percentage of employees' own contribution. Panel B also tells us that the offering of employer stock is positively correlated with the first and next 3 percent of employer match. In addition, the more funds offered in a 401(k) plan, the higher the proportion of stock funds.

It is worth noting that retirement plan designs are complicated along other dimensions. Figure 10-2 indicates that the 401(k) plan designs fall into four broad categories: firms offering 401(k) plans alone (some 39 percent of plans); firms offering 401(k) plans accompanied by another DC

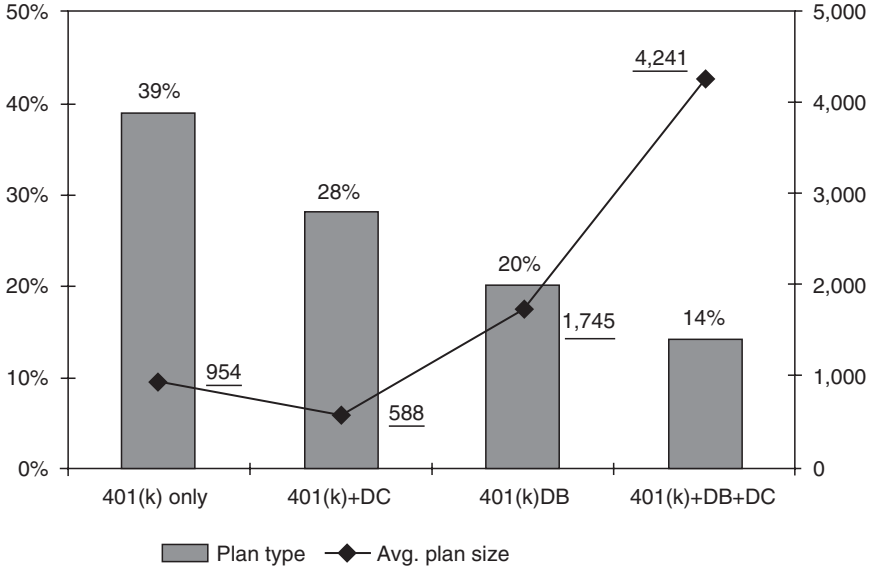

Figure 10-2. The coexistence of DC and DB plans (507 plans).
Source: Authors' calculations.

TABLE 10-2 Employee Characteristics for the Analysis Sample

	Variable name	*Plan mean*
Age	Mean_age	42.7 years
Income ($000)	Mean_comp	$63.9
Job tenure	Mean_tenure	8.7 years
Sex (% female)	Female_pct	36%

Source: Authors' calculations.

plan such as a money purchase, profit-sharing, or ESOP plan (28 percent); firms providing 401(k) plans paired with a DB plan (20 percent of plans), and firms offering 401(k) accompanied by both a DB plan and other DC plans (14 percent).[15] Clearly, those who see US private pensions as being either of the DB or DC variety have far too simplistic a view. Accordingly, the analysis is to follow controls on the existence of other DB or DC plans as factors influencing 401(k) plan generosity.

A summary of plan-level employee characteristics for the more than 740,000 workers in the full sample appears in Table 10-2. The average participant in the average plan is nearly forty-three years old, earns $63,900 a year, has spent almost nine years on the job, and possesses a 401(k) account with the balance of $54,400. Comparing our data with those of the EBRI/ICI 2001 (Holden and VanDerhei 2003), these two data-sets are identical in median age and tenure. However, the median compensation and average account balance of our data-set are higher than those of EBRI/ICI at $30,130 and $43,215 respectively.

Multivariate Analysis

To evaluate how employers design 401(k) matching contributions, we turn to Table 10-3. For the set of 507 plans, we see that match generosity is clearly a function of firm size (columns 1, 2, and 6). Larger firms are more likely to provide a match in the first place and a more generous match on the first 3 percent of pay, as well as a larger overall economic value to the match (*MaxCostERMatch*). For example, a 10 percent increase in firm size evaluated at the mean will raise the value of the promised match by 9 percent. This firm size effect disappears on higher levels of pay, presumably because larger firms are more likely to offer another DB or DC plan besides the 401(k) plan. In effect, as firm size increases, employers appear to offer other retirement plans, and so they are marginally less generous with the 401(k) matching contribution.[16]

TABLE 10-3 Determinants of Employer 401(k) Plan Design: Match Features (All Employees)

	Components of employer 401(k) match					
	Positive_ Match	*Match_f3*	*Match_n3*	*Match_n2*	*Contr4Max Match*	*MaxCost ERMatch*
Employer characteristics						
Plan_size	0.044	4.474	−0.443	−0.027	0.104	0.187
	[0.013]**	[1.468]**	[0.919]	[0.461]	[0.069]	[0.071]**
DB	0.026	7.308	3.697	−3.933	0.016	0.32
	[0.043]	[4.100]	[2.909]	[1.714]*	[0.252]	[0.238]
DC	−0.024	−1.464	−7.288	0.168	0.26	−0.277
	[0.036]	[3.670]	[2.299]**	[1.378]	[0.226]	[0.205]
Employee characteristics						
HCE_pct	−0.003	−0.041	−0.022	−0.075	−0.023	−0.007
	[0.002]	[0.149]	[0.090]	[0.061]	[0.008]**	[0.009]
Mean_comp_	0.007	0.729	0.315	0.075	0.022	0.05
NHCE	[0.003]**	[0.245]**	[0.124]*	[0.088]	[0.015]	[0.013]**
Mean_age	0.01	1.299	−0.496	0.524	0.044	0.083
	[0.008]	[0.694]	[0.433]	[0.313]	[0.049]	[0.046]
Mean_tenure	−0.013	−1.296	0.167	−0.171	−0.08	−0.083
	[0.007]	[0.666]	[0.434]	[0.295]	[0.040]*	[0.042]*
Female_pct	0.0004	0.126	0.065	−0.051	−0.012	0.003
	[0.001]	[0.110]	[0.070]	[0.049]	[0.006]	[0.007]
Observations	507	507	507	507	507	507
R^2	0.07	0.11	0.43	0.11	0.52	0.1

Source: Authors' calculations.

Notes: * significant at 5%; ** significant at 1%. Robust standard errors in brackets. Industry controls included. NDT_cap is controlled in all models. In the regression of higher level of match, i.e. Match_n3 and Match_n2, the lower level match rates, Match_f3 and Match_n3, are controlled.

In terms of workforce characteristics, the sponsor's 401(k) match formula proves to be positively associated with NHCE pay levels: that is, the probability of offering any match, as well as larger match rates on the first 6 percent of pay, rise with pay (columns 1–3), as does the overall economic generosity of the match (column 6). In other words, the design of the employer match pattern is clearly motivated by workforce pay levels. The effects are modest in size but statistically significant. For example, if the mean NHCE income of $42,000 increases by 10 percent, the match rate on

the first 3 percent of pay rises by 6 percent (from $0.55 to $0.58), and the match rate on the next 3 percent rises by 4 percent (from $0.37 to $0.39). The variation in the match design according to different levels of NHCE income is also estimated, holding all other independent variables at their means. For example, for a workforce with a mean NHCE income of $25,000 (approximately the bottom 5 percent of firms), 80 percent of firms offer a match, and the maximum promised match amount on average to 2.3 percent of pay. For a workforce with a mean NHCE income of $55,000 (the top 5 percent of firms), all firms offer a match, and the promised match is more than one and a half times higher, at almost 4 percent of pay.

Because the general nondiscrimination rules restrict employers from favoring HCEs over NHCEs, and since the dollar contribution caps more effectively bind HCEs rather than NHCEs, we find that only NHCE income is a statistically significant factor in our regression analysis. The percentage of HCEs in a plan has no influence on plan generosity, suggesting that federal limits are binding. Equally important is what the data do not show. Plan design bears no apparent relationship to workforce characteristics *other than pay*. This finding is of interest since, if employers fashioned their match formulas to attract and retain workers with specific demographic characteristics, we might anticipate significant coefficients on such factors as employee age and tenure. However, no such relationships are evident. There is one exception: employers appear to reward shorter-tenure workforces with a higher match, but only as long as they contribute more of their own income. As we argue below, this effect is readily explained by efforts to satisfy federal nondiscrimination testing rules among short-tenured workforces. Overall, the employer match appears to be mainly motivated by the need to offer better-paid employees higher compensation in the form of 401(k) matching contributions. Yet due to the tax rules constraining contributions by the highly paid, these incentives prove to be a linear function of NCHE income only.

Next we consider the factors shaping 401(k) plan nonmonetary features, reported in Table 10-4. Here we examine three attributes of the investment menu: the number of funds (*NFundsOffered*), the percentage of the menu that represents stock funds (*Fund_Stock*), and the presence of company stock (*ER_Stock*); and also preretirement access, namely the availability of after-tax contributions and loans (*After_Tax* and *Loan*, respectively). Not surprisingly, an important determinant of the plan menu features is again plan size. Probably due to scale economies, larger employers are more likely to offer more funds in the investment menu, a larger percentage of equity funds, and company stock, and they are also more likely to permit after-tax contributions and participant loans. Firms which offer DB plans are more likely to offer employer stock in their DC plans (consistent with recent findings by Brown, Liang, and Weisbenner 2004).

TABLE 10-4 Determinants of Employer 401(k) Plan Design: Non-Monetary Plan Features (All Employees)

	Investment menu			*Money access*	
	NFunds offered	*Fund_ stock*	*ER_ stock*	*After_ tax*	*Loan*
Employer Characteristics					
Plan_size	0.914	1.79	0.115	0.083	0.046
	[0.172]**	[0.546]**	[0.012]**	[0.014]**	[0.011]**
DB	0.537	−3.107	0.097	0.194	0.019
	[0.699]	[1.619]	[0.040]*	[0.051]**	[0.036]
DC	−0.634	0.129	−0.004	−0.064	0.001
	[0.591]	[1.389]	[0.029]	[0.034]	[0.032]
Employee Characteristics					
Mean_comp	0.026	0.038	0.001	0.0009	0.0003
	[0.007]**	[0.012]**	[0.0003]*	[0.0004]*	[0.0003]
Mean_age	0.216	0.391	0.001	0.006	0.001
	[0.124]	[0.357]	[0.005]	[0.006]	[0.008]
Mean_tenure	−0.058	−0.398	0.01	0.002	−0.001
	[0.088]	[0.303]	[0.005]	[0.006]	[0.006]
Female_pct	0.024	0.08	−0.0003	−0.0002	0.001
	[0.014]	[0.035]*	[0.001]	[0.0008]	[0.001]
Observations	507	507	507	507	507
R^2	0.1	0.09	0.35	0.24	0.06

Source: Authors' calculations.
Notes: * significant at 5%; ** significant at 1%. Robust standard errors in brackets. Industry controls included.

Turning to workforce variables, once again relatively few employee attributes appear to be associated with plan design features. All elements of 'better' plan design are associated with employee income.[17] Better-paid employees have 401(k) plans with more funds, with a greater proportion of equity funds in their investment lineup (allowing greater diversification in what is an equity-dominated portfolio), the ability to invest in company stock (perhaps undesirable from a diversification perspective but attractive in terms of employee ownership and loyalty), and access to after-tax contributions. Most of these effects, while significant, tend to be relatively small in economic terms. For example, a 10 percent increase in mean NHCE income leads to only a 0.1 point increase in the number of funds.

From this analysis, we conclude that employer 401(k) plan design decisions are mainly driven by scale economies (firm size) and employee

compensation (which for matching contributions is mean NHCE compensation due to tax limits). These results are consistent with the view of 401(k) plans as mainly a form of employee-preferred tax-deferred compensation. Better-paid NHCEs are likely to benefit from having a higher fraction of their earnings paid in the form of tax-deferred compensation, and it appears that employers design their 401(k) matching contributions plans with this consideration in mind. Arguably, without federal tax limits on contributions, both cash- and noncash incentives would both be more nearly a linear function of earnings. There seems to be little evidence that plan design is motivated by employer efforts to tailor their workforce to other demographic characteristics such as age or tenure.

Discussion and Conclusions

This paper examines the determinants of employer decisions regarding 401(k) plan design. Drawing on a unique data-set of more than 500 plans and over 740,000 employees, we find that patterns of plan design and employee behavior reflect two forces. On the one hand, better-paid workers demand 'richer' 401(k) plans from employers, but on the other hand, employers must provide minimum incentives to lower-paid workers under federal nondiscrimination testing rules. At the plan level we find that match formulas are mainly a function of NHCE income, after controlling for other key attributes. Other desirable nonfinancial elements of 401(k) plan design—such as more investment choice, 401(k) loans or after-tax contributions—are also a function of workers' earnings. In other words, 401(k) plan design appears strongly motivated by a desire to satisfy higher-paid employees' demand for tax-advantaged compensation. Controlling on pay, there is very little evidence that firms design their matching contributions to attract and retain employees with specific characteristics. This combination of findings leads us to conclude that 401(k) plans are mainly a complex form of tax-advantaged compensation, with both its provision by employers and its take-up by employees influenced by the average earnings level of a given firm.

Our findings imply that tax-motivated matching contributions in 401(k) plans may be an imperfect way of ensuring broad-based retirement security. As we note, it is better-paid workers who will demand better matching contributions from their employers in the first place, and take-up of these matching contributions will be a function of a given workforce's savings preferences. Also it appears that federal tax policy regarding nondiscrimination testing may enhance tax preferences within a firm, but tends to create inequities across firms. This is because matching incentives and participation rates tend to be more generous in companies with better-paid workers. As a result, nondiscrimination rules favor workers in companies with better-paid and longer-tenured workforces, while not helping those lacking these characteristics. Finally, because of firm-level design

decisions, saving patterns in 401(k) plans tend to be 'local'. Thus, a low-wage worker employed all her life at a high-wage consulting firm would do better in retirement than if she earned the same salary but worked at a low-wage retail firm. Her high-wage colleagues in the consulting firm will demand a larger match, which will in turn induce a higher rate of plan participation by her and other lower-wage employees.

As a consequence, those seeking to enhance retirement security among low-income and low-tenured populations might consider alternatives to matching contributions in 401(k) plans. Options include automatic enrollment (cf. Madrian and Shea 2001), nonelective contributions by employers or the government, and mandatory retirement plan contributions. Reframing enrollment as a negative election encourages 401(k) saving regardless of the firm-specific match incentive, and it also induces retirement saving regardless of that specific workforce's taste for saving. Employer nonelective contributions accomplish the same goal but in a different way. By making the same retirement contribution to all eligible employees, employers in effect substitute for weak employee saving preferences with their own. The same would be true of governmental nonelective contributions made to private plans or to a reformed social security system with personal accounts. Mandatory retirement plan contributions, whether made by the employer or employee, are an option adopted by countries such as Singapore and Australia, where they create uniformity of retirement saving independent of firm-specific characteristics.

Endnotes

1. There are three times as many US workers participating in DC plans as DB plans. Since 1985, the number of DB plan participants has declined by 8 percent annually and these plans hold fewer assets than in DC plans (DB assets are estimated at $2.2 trillion; Vanguard, 2004).
2. In this chapter, we use the term '401(k)' to include both 401(k) and 403(b) salary deferral plans. The former are offered in the corporate sector, while the latter are offered by nonprofit employers, but both terms are derived from the section of the US tax code permitting contributions to these retirement plans to be tax-qualified under particular conditions (McGill et al. 2004). Our analysis excludes governmental plans (e.g. so-called Section 457 plans). More than 70 percent of US DC plans are 401(k)-type programs and 85 percent of DC plan participants have a 401(k) feature.
3. Employer retirement plan contributions are only deductible to the extent of federal tax limits. Some have argued that firms may derive a benefit from offering employer stock within a DC plan, but productivity gains from company stock tend to be negligible and may reflect employer and employee myopia about benefits and costs (Benartzi et al. 2004; Mitchell and Utkus 2003).
4. For instance, Wachovia states on its website that the 'employee benefits plan protects the most important resource of your business—your employees.

Employee benefits can be one of your most valuable recruiting tools. We can help you assemble a generous and affordable benefits plan that attracts and retains the best employees.' (*http://www.wachovia.com/small_biz/page/0,,446_610_1303_1312,00.html*)

5. In fact, Ippolito sees this compensation structure as a way to reward unobserved but valuable employee traits, such as willingness to defer gratification ('low discounters'), on the grounds that these workers may actually be more productive. He also believes that DB plans with back-loaded benefits designs permit firms to reward long tenure and experience.
6. This skewness is not unique to our sample. For instance, Mitchell and Utkus (2003) report that only 3 percent of US DC plans offer company stock, but because they are among the largest US firms, 42 percent of participants are found in these plans.
7. Engelhardt and Kumar (2003, 2004) are an important exception and provide important detail on the nature of 401(k) matching contributions.
8. In the most common case of the Actual Deferral Percentage or ADP test, if the saving rates of the NHCEs fall between 2 and 8 percent, the HCE saving rate cannot be more than 2 percent higher than the NHCE rate. There are different rules when NHCE saving rates fall below 2 percent or above 8 percent.
9. Under the NDT testing rules, should NHCE contribution rates fall short of the legally required amount, the plan is said to 'fail' nondiscrimination testing. In this case the plan can either refund HCEs' contributions, which is a laborious and time-consuming process for the employer and may require the employee to file a revised tax return, or alternatively the employer may simply limit HCE contributions to some lower rate to avoid failing the test in the first place. For example, an employer could restrict HCEs to no more than a 6 percent contribution rate to meet the nondiscrimination rules, in which case a HCE earning $100,000 would be allowed to contribute only 6 percent, rather than the statutory 10.5 percent of salary noted earlier. In practice HCEs are often capped at a flat rate (such as 6 percent) when a plan fails nondiscrimination testing, though the sponsor may also impose a dollar limit. HCEs subject to a cap in the 401(k) plan are sometimes eligible for executive compensation or nonqualified plans instead. Another option for capping HCEs is to subject those in executive plans to a smaller 401(k) limit, while allowing lower-paid HCEs not eligible for the executive plan to save at a higher rate.
10. The identity of individual firms and plan participants is masked. Union plans are excluded from our sample of 507 plans, since there the match is collectively bargained rather than determined solely by the employer.
11. The datafile does not include measures of employee educational attainment or workplace financial education programs, though all employees received plan enrollment material and a quarterly plan newsletter, and all have access to online educational materials. We also lack data on vesting schedules for employer contributions, indicating participants' ability to take employer contributions with them when they change jobs. We did investigate tenure patterns in more detail (an analysis not reported here), and the results were similar to those shown here.

12. According to the US Department of Labor, 84 percent of full-time private industry employees in the US in 2000 were in saving and thrift plans with a 'determinable' match rate (DOL 2004: 69).
13. At the employee level, since more participants are in large plans, nearly four in ten participants are provided with a match equivalent of 3 percent of pay. But this 3 percent promise can manifest itself in quite different ways in terms of required employee contribution: as a $0.50 on the dollar match on a 6 percent employee contribution, as a $1 for dollar match on a 3 percent employee contribution, or, less frequently, something in-between.
14. With after-tax contributions, employees may withdraw contributions at any time. Earnings compound tax-free and are subject to the same restrictions governing pretax contributions. Because of their liquidity, after-tax contributions compete with pretax saving, and so any regression of pretax saving against after-tax contributions should show a negative coefficient for the after-tax indicator. In a number of plan designs, employees who reach various federal tax limits on pretax contributions are able to make additional after-tax contributions, thereby gaining an additional tax benefit, the ability to defer taxes on the earnings on such contributions.
15. In the case of DC plans, a 401(k) participant may receive an employer contribution to a companion money purchase plan, profit-sharing plan, or Employee Stock Ownership Plan (ESOP). The profit-sharing or ESOP contribution may be integrated within the 401(k) plan itself, or it may be in a standalone plan.
16. All equations also control on industrial sector and, predictably, firms in sectors like manufacturing or finance and insurance had more generous designs than firms in wholesale/retail trade (results not reported here in detail but available on request).
17. We do not distinguish between NHCE and HCE employees because there are no federal constraints on nonmonetary plan design features.

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