ARTICLE

MAY 2013

The relationship between job characteristics and retirement savings in defined contribution plans

Pension trends in the United States, marked by the movement toward defined contribution (DC) plans, raise questions about the individual characteristics that influence retirement saving behavior. This study examines how DC participants' industry and employer characteristics relate to the prevalence of reduced retirement account contributions in a time of severe recession (2007–2009). Data come from a restricted-use file that matches workers in the 2008 Survey of Income and Program Participation (SIPP) to their W-2 tax records received by the Social Security Administration. These data provide a unique opportunity to trace the longitudinal changes in DC retirement account contributions of a sample of private-sector workers who participated in a DC plan in 2007 and remained with the same employer throughout the recession. Multivariate probit models indicate several job-related factors as significantly related to the likelihood of reductions in contributions, including industry-specific employment losses, employer size, and reduced individual earnings. The results call attention to the potential role of employer and industry characteristics, as well as individual worker characteristics, in shaping retirement savings decisions.

The landscape of U.S. employer-sponsored pensions has undergone substantial changes over recent decades. These changes have been marked by the shift from traditional defined benefit (DB) plans to defined contribution (DC) plans.[1] A central feature of most DC plans is that employees must take a more active role in their own retirement preparation: employees decide whether to participate, how much to contribute, how contributions will be invested, and whether to change these contributions and investments over time. Such decisions, in turn, can have considerable effects on an individual's retirement resources.

In this article, we explore how the job characteristics of individuals who participate in DC plans are associated with longitudinal changes in their contribution levels, namely the probability of experiencing a substantial reduction in contribution levels during a time of severe recession (2007–2009). This focus, although narrowly defined, is interesting for several reasons. First, despite a variety of studies assessing the relationship between contribution behavior and individual and plan characteristics,[2] there is surprisingly little information on how job characteristics relate to employee contributions. Most studies, moreover, do not focus on the same DC plan participant over multiple years. Existing studies also do not provide a basis for understanding of how job characteristics might help account for differences between DC participants who reduce their contributions over time, including during the recent recession, and those who do not.

The focus of this article also provides insights into how retirement savings behavior during the Great Recession related to an individual's job characteristics.[3] We know that aggregate retirement wealth fell sharply between 2007 and 2009.[4] Much of this loss stemmed from a decline in stock prices, but unemployment and falling wages, among other factors, also may have led to reduced contributions to retirement accounts.[5] No research has systematically examined how job characteristics potentially relate to this dynamic. For example, economic conditions may affect DC plan participants of particular

industries or employer sizes differently. Perceptions of job security may vary by industry, and employer matches may differ between large and small employers.

Understanding contribution behavior is also important because contributions can affect an individual's retirement security. In general, consistently contributing to a retirement account over one's working life will increase retirement income security. However, a reduction in contributions, especially if it is long term, could have adverse implications for financial well-being during retirement.

We draw data from a unique, restricted-use file that matches a nationally representative sample of workers from the 2008 Survey of Income and Program Participation (SIPP) to their W-2 tax records received by the Social Security Administration (SSA). The SIPP data contain information on job characteristics around the beginning of the recession, and the administrative data provide longitudinal information on respondents' actual DC plan contributions and earnings over the 2007–2009 period. Together, these data provide a unique opportunity to study participant-level changes in contribution levels over the financial crisis by job characteristics, controlling for observable differences across individuals.

In our analysis, we follow private-sector workers who participated in a DC plan in 2007 and had the same employer throughout the recession. This allows us to present estimates that are not influenced by job change, unemployment, or time spent not in the labor force. The results bring into focus several job characteristics as they relate to a reduction in DC plan contributions over the recession. We find that the higher the employment losses in the industries in which DC plan participants work, the greater the probability of observing a substantial reduction in real contributions between 2007 and 2009, holding important covariates constant. The likelihood of reduced contributions was also greater for DC plan participants who worked for a small employer and for those who experienced a decrease in individual earnings.

We find that the higher the employment losses in the industries in which DC plan participants work, the greater the probability of observing a substantial reduction in real contributions between 2007 and 2009, holding important covariates constant.

The next section further elaborates the background of the study. This is followed by a description of the data, methods, and results. The final section summarizes the main findings and implications.

Background

Along with Social Security and personal savings, employer-sponsored pensions represent a key pillar of U.S. retirement security. The movement away from the use of traditional DB pensions and toward the use of DC retirement accounts has been well documented.[6] In recent years, DC plans have become the dominant employer-sponsored retirement plan for private-sector workers with pensions.[7] Workers participating in these plans elect to defer some portion of their salaries or wages into a qualified retirement savings account.

A central advantage of DC plans to employees is that the plans are portable from job to job.[8] They are also more flexible than traditional DB pensions (e.g., under certain circumstances, employees may access funds before retirement). Employees typically decide how much to contribute (some employers also match employee contributions) and how the account is to be invested. The opportunity to change contribution amounts has potential advantages and risks. An advantage is that workers are able to reduce their contributions to smooth consumption and improve well-being when experiencing an income shock. A risk is that workers who reduce their contributions, especially over the long term, potentially reduce their retirement resources; contributions generally need to occur regularly over one's

worklife to provide adequate income during retirement years.[9] Moreover, consistency can provide "dollar averaging," and DC-plan participants who choose to not contribute during a falling market, or who contribute less, probably fail to "buy low."

In this context, an important research and public policy focus is the consideration of whether (and why) workers participate in a retirement plan and how much and for how long over their working lives they contribute. This issue is particularly relevant in light of the 2007–2009 recession.[10]

There are several reasons why DC plan participants might change—namely, reduce—their contributions during an economic downturn. First, individuals' financial outlook may change. Compared with regular savings, savings in DC accounts are less liquid and, therefore, not as easily tapped for current consumption in the event of a financial emergency. If workers are worried about the economy or perceive rising unemployment as a threat to job security, they may be less willing to participate in a 401(k) plan or to contribute as much as they had before the downturn began. Participants may choose to divert some savings from retirement accounts to general purpose savings out of a reluctance to withdraw money from retirement accounts before reaching retirement age.[11]

Second, an individual's financial circumstances can change. An economic downturn could lead to job loss or reduced earnings, which can alter savings and consumption patterns.[12] An economic downturn may correlate with a decline in family income or assets (such as housing wealth), which might induce DC plan participants to reduce contributions. Alternatively, greater economic distress may prompt some to consume less and save more.[13] Recent research, for example, provides evidence that older households incurred substantial losses in assets over the 2007–2009 recession and, in response, consumed less, saved more, and worked longer.[14] Furthermore, economic conditions can be associated with family status change, such as divorce,[15] and changes in family structure can alter one's financial circumstances.[16]

Third, a changing economic environment may encourage employers to alter provisions of their DC plan.[17] There is evidence that the recent recession led some companies to reduce or suspend matching contributions.[18] This is important in light of research showing that of an employer match can have an impact on DC plan participation and contributions.[19]

Relatively little empirical research has assessed how DC participants' level of contributions evolved over the recent recession. Existing studies based on administrative data from investment firms indicate that inertia generally prevailed over the recession for workers already participating in DC plans.[20] One study, for example, reported that about 70 percent of Vanguard DC plan participants made no changes to their elective contribution rates in 2008 while 20 percent increased contribution rates and only 7 percent decreased contribution rates.[21] However, an analysis of national survey data matched to longitudinal tax records found evidence of a greater prevalence of reductions in contribution levels during the recent recession (2007–2009) relative to a prior, nonrecessionary period (2005–2007).[22]

In addition to economic conditions, individual characteristics are important determinants of contribution levels. A life cycle model views age as a key factor related to individual savings and financial outlook.[23] Put simply, a life cycle perspective maintains that savings would follow an inverted U-shape over one's own life. Adults who are in their peak earnings years would be expected to increase savings, while younger people, who have less income and fewer financial assets, would be expected to save less and contribute less to DC plans.

Nonetheless, contribution behavior also varies among individuals within the same age range. This is due in part to differences in individual preferences (e.g., taste for saving) and attitudinal variables, such as planning horizon. Also important are socioeconomic differences—such as earnings, family income,

and wealth—as well as educational attainment, marriage, and race/ethnicity.[24] Plan characteristics, such as employer matches, investment choices, and ability to borrow, also correlate with contributions.[25] Moreover, a wide range of social and psychological factors can be potential correlates.[26]

Job characteristics and DC plan contributions during recession. One set of characteristics often overlooked in the literature is the job characteristics of DC participants. Prior studies have revealed the importance of job characteristics on retirement timing and pension plan features, but no research has traced out its association with contribution behavior.[27] Given a lack of empirical work in this area, the most relevant job characteristics are difficult to distinguish precisely. Further complicating the picture, job characteristics can be defined in many ways, ranging from physical and intellectual demands, organizational tasks, and earnings and fringe benefits to environmental conditions. Herein, we examine how several broad characteristics—including employment loss in DC plan participants' industry of employment, employer size, job tenure, occupation, union membership, and earnings—were associated with contributions to DC plans during the 2007-to-2009 recession. An advantage of looking at these characteristics is that they are observable in national survey data.

The channels that are expected to link the job characteristics examined in this study with contributions to DC plans over the recession are as follows. If participants' contribution levels respond to what is happening to the participants personally, their contributions might also respond to what is happening to workers around the participants (i.e., peer effects). Of particular significance is evidence that job losses can affect not only those losing their jobs but also those who remain employed.[28] Accordingly, as employment losses in an industry increase, the perception of job security among employees within that industry decreases. Under these conditions, participants may reduce their retirement contributions, for example, by building up their precautionary savings in nonretirement accounts. Alternatively, companies operating in an industry with heavy employment losses might be more likely to reduce or suspend matching contributions. Such circumstances could place downward pressure on the contributions of DC plan participants within these industries.

Employer size also might be consequential. Relative to large employers, small businesses tend to have more employee turnover,[29] are more likely to go out of business in any given year, and are more likely to reduce or suspend employer matches during a recession.[30] In contrast, large employers tend to provide more job security,[31] match employee DC plan contributions,[32] and provide more investment choice in their DC plans.[33] In this context, DC plan participants who work for smaller employers may have a greater likelihood of reducing their contributions relative to those who work for larger employers.

Union status may be important to contributions to DC plans, particularly during an economic downturn. Union contracts often include retirement plan provisions, and insofar as union membership provides job security and stable wages, unionized workers may feel less likely to be laid off during a recession which, in turn, may influence retirement savings. Another factor is job tenure. Longer-tenured workers may have longer planning horizons—and may be closer to retirement—and greater seniority sometimes provides greater job security in the event of layoffs during an economic downturn. We would expect that the longer individuals already participating in a DC plan have worked at a particular job, the less likely they would be to experience a reduction in their contributions over the recent recession, all else equal.

Occupation also could be pertinent. Given that the recession more adversely affected blue-collar workers,[34] DC plan participants in managerial and professional occupations may have been less likely than blue-collar workers to reduce their contributions, all else being equal. Having a job that also offers

a DB pension plan may be associated with a recessionary decline in contributions to DC plans.[35] For example, one might expect individuals who participate in both a DC and DB plan to be more likely to reduce DC contributions in favor of consumption in the event of a financial emergency or growing pessimism about the economy. On the other hand, jobs that provide both DB and DC plans may attract individuals with a taste for savings, and these individuals may be less apt than others to reduce their contributions.[36]

Personal earnings often play a pivotal role in determining DC plan participants' level of contributions. In general, lower earners are less likely to participate in a DC retirement plan when eligible.[37] More importantly for this study, among workers already participating in a DC plan, consistency of contribution amounts over time is likely to be highly sensitive to changes in individual earnings, and perhaps even more so during a recession.

Data and methods

Our data consist of the 2008 panel of the Survey of Income and Program Participation matched to W-2 tax records received by the Social Security Administration. The SIPP is a nationally representative panel survey of the civilian noninstitutional U.S. population conducted by the Census Bureau. In this study, we used waves 1 through 5 of the 2008 SIPP panel. The first interviews (wave 1) inquired about income and employment in the months of May through August of 2008. The last interviews (wave 5) referred to the months of December 2009 through March 2010.[38]

Linking the SIPP with SSA's Detailed Earnings Record (DER) file provides longitudinal information on respondents' annual earnings and tax-deferred contributions to DC plans (e.g., 401(k), 403(b)) on the basis of their W-2 tax records.[39] These data are exceptionally useful for tracking individual earnings and DC plan contributions over multiple years. Another virtue is that they more accurately measure DC retirement account contributions than do self-reported data, as collected in household surveys.[40] The administrative data do not contain information on employer contributions.

Our study sample consists of people ages 29–59 years in wave 1 of the 2008 SIPP panel who (1) were matched to the administrative records, (2) were present through wave 5 of the SIPP panel, (3) had positive earnings in both 2007 and 2009, and (4) had participated in a DC plan in 2007. We thus observe how workers who were already contributing to a DC retirement account at the start of the recession changed their contributions, if at all, during the recession.

To make the analysis more straightforward, we applied several other restrictions:

- Because DC retirement plans are not offered to most part-time workers, we limited our sample to workers employed full time at wave 1.
- To ensure that a person's job characteristics reported in wave 1 (referring to the summer of 2008) were applicable to the beginning of the recession (late 2007), we selected only people who had started their primary job before December 2007.
- We looked only at private-sector workers because the relationship between job characteristics and DC retirement plan contributions are likely to be different for public sector workers.[41]
- Workers must have remained with the same employer from the start of the SIPP through December 2009, the calendar year including the official end of the recession.[42] This is important because it allows us to exclude cases in which job change or job loss led to reductions in DC plan contributions.

- The analysis excludes agricultural workers and the self-employed because of their unique labor market situations.

Exhibit 1 lists our selection rules for the SIPP-DER dataset, which yielded a final sample of 4,747 individuals.

Exhibit 1. Main restrictions of study sample, SIPP-DER dataset
1. Ages 29–59 (SIPP wave 1)
2. Positive earnings in 2007 and 2009 (DER)
3. Positive contributions in DC plan, 2007 (DER)
4. Full-time, private-sector workers (SIPP wave 1)
5. Started job before December 2007 (SIPP wave 1)
6. Retained same employer through December 2009 (SIPP waves 1–5)
7. No self-employed or agricultural workers (SIPP wave 1)

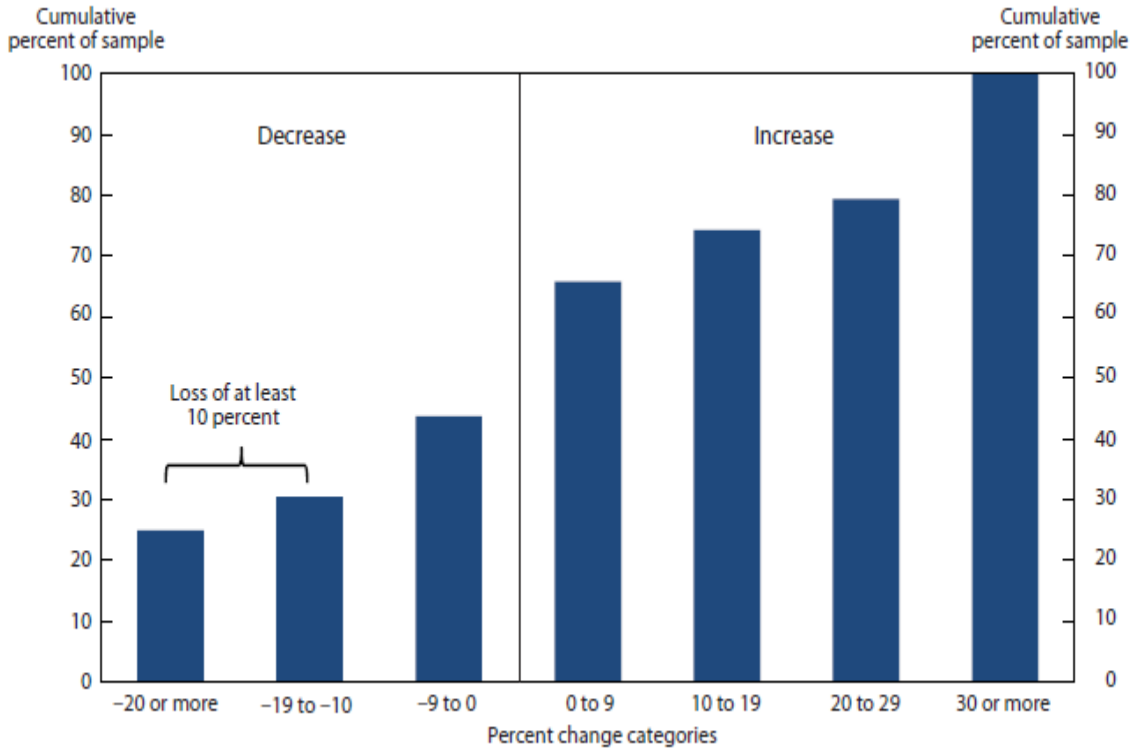
Analysis and measures.We use descriptive tabulations and multivariate probit models to examine how the job characteristics of DC account participants in 2007 are related to having a reduced annual contribution in 2009 relative to 2007. The general model is descriptive and can be expressed as follows:

$$Y = \alpha + \beta_1 JOB + \beta_2 C + {}_E,$$

where Y is the estimated probability of a reduction in employee annual DC account contributions of 10 percent or more between 2007 and 2009 net of other characteristics, α is the intercept, βs are the regression coefficients, and $_E$ is the error term. Vector *JOB* reflects the job characteristics, and the vector *C* refers to the control variables.

The dependent variable Y equals 1 when a DC plan participant's 2009 contribution reflects at least a 10-percent real decline relative to 2007; if not, then Y equals 0. The choice to use a 10-percent threshold reflects a reasonable approximation of substantial loss that goes beyond incremental changes in salary. To display the underlying distribution of this variable, chart 1 reports the cumulative percentage change in DC retirement contributions between 2007 and 2009 among our analysis sample. As can be observed, the 10-percent (or more) threshold captures the majority of reductions over the period. Note that our results are robust to different specifications (e.g., –15 percent, –20 percent).

Chart 1. Cumulative distribution of percent change in real DC plan contribution among analysis sample, 2007–2009



SOURCE: Authors' calculations using Social Security administrative records matched to 2008 Survey of Income and Program Participation data.

The main independent variables measure the characteristics of a person's main job, as determined by hours of work. The first variable of interest is industry-specific employment change over the observation period. To construct this variable, we use the seasonally adjusted percentage change in employment from December 2007 to June 2009 by industry as estimated by Christopher Goodman and Steven Mance.[43] This source (which uses the BLS Current Employment Statistics survey) provides better aggregate estimates of industry-specific employment loss over the recession than SIPP's household data. We then use the SIPP data to establish the industry of employment of respondents in our sample and assign to them the December 2007–June 2009 job loss percentage of their industry discussed above. Combining this information, we thus have a continuous variable indicating the percentage change for respondents' industry of employment over the recession. The last column in table 1 lists these values. As is seen, industries with relatively high employment loss include construction and durable manufacturing, and those with relatively low employment loss include educational and health services and utilities.

Table 1. Descriptive statistics for analysis sample

Job characteristic or demographic control	Percent/ mean	Standard error	Percentage change in seasonally adjusted employment(1)
Job characteristics			
Educational and health services	17.2	0.60	3.3
Utilities	2.0	.22	.6
Personal and other services	2.6	.28	–2.5
Leisure and hospitality	2.5	.27	–3.4
Financial activities	12.1	.45	–5.8
Retail trade	10.1	.50	–6.7
Transportation and warehousing	3.8	.30	–7.3
Mining and logging	0.7	.66	–7.3
Wholesale trade	4.9	.35	–7.6
Information	4.3	.39	–7.6
Professional and business services	11.7	.49	–8.9
Nondurable manufacturing	7.1	.38	–9.8
Durable manufacturing	18.0	.72	–17.5
Construction	3.0	.27	–19.8
Employer size in 2007			
1–49 employees	20.9	.69	—
50–99 employees	8.8	.38	—
100 employees or more	70.4	.75	—
Job tenure 7 years or less in 2007	57.4	.84	—
Union membership in 2007	8.2	.47	—
Managerial or professional occupation	49.6	.80	—
Defined benefit pension plan	37.5	.90	—

Job characteristic or demographic control	Percent/ mean	Standard error	Percentage change in seasonally adjusted employment(1)
Hours change from full time (2007) to part time (2009)	7.5	.46	—
Mean of the logarithm of 2007 earnings	10.95	.01	—
Loss of at least 10 percent in individual real earnings, 2007–2009	19.1	.64	—
Demographic controls			
Female	43.2	.76	—
Married	71.1	.79	—
Marital status change(2)	3.2	.29	—
Bachelor's degree	42.1	.81	—
Non-White	22.0	.71	—
Age (mean)	43.9	.13	—
Metropolitan area(3)	81.8	1.37	—
Number	4,747	—	—

Notes:

(1) Industries are shown from lowest to highest employment loss by percentage change in seasonally adjusted employment, December 2007–June 2009. These data are adapted from Christopher J. Goodman and Steven M. Mance, "Employment loss and the 2007–09 recession: an overview," Monthly Labor Review, April 2011, table 1.

(2) Change in marital status between wave 1 and the end of 2009.

(3) Individual's residence is located in a metropolitan area.

Note: Data are weighted and corrected for SIPP's complex survey design.

Source: Authors' calculations using Social Security administrative records matched to 2008 Survey of Income and Program Participation data.

Note that sensitivity analysis using alternative specifications of our industry-specific employment change variable (e.g., using 3- and 14-point ordinal groups ranked from lowest to highest employment loss over the recession) showed similar results. We also tested models where the variable was binary (1 = respondent was in industry with above-average employment loss, 0 = otherwise). Those results show patterns similar to those presented in the paper.

We measured several other job characteristics using SIPP data reported by respondents in the first interview of the panel. Employer size was measured by three binary variables indicating 1 to 49 employees, 50 to 99 employees, or 100 or more employees. Binary variables also measured whether workers had high job tenure at the start of the recession (1 = 7 or more years at the same job, 0 = otherwise), union membership (1 = yes, 0 = no), professional-manager-technical occupation (1 = yes, 0 = no), and participation in a DB pension plan (1 = yes, 0 = no). To control for a reduction in work hours during the observation period, we measured whether the worker was working part time (usually worked fewer than 35 hours per week) by December 2009 (1 = yes, 0 = no).

Sociodemographic controls using SIPP data included dummy variables for race and ethnicity, gender, college degree, and marital status, and for whether the individual's residence was located in a metropolitan area. A binary variable also accounted for any marital status change between wave 1 and the end of 2009 (wave 5). Respondents' age was measured in years.

Personal earnings, which use the matched DER data, were measured in two ways. First, we introduced the natural logarithm of the workers' 2007 annual earnings from their main job. Second, to account for changes in earnings over the observation period, a binary variable indicated if a respondent's real earnings declined by more than 10 percent from 2007 to 2009 (1 = yes, 0 = no). This allowed us to test if reduced DC plan contributions occurred concomitantly with reduced labor earnings (i.e., passive change).

We reported the results from the probit models as marginal effects, which can be interpreted as the association between an independent variable and the probability that the DC plan participant (as of 2007) had substantially reduced contributions in 2009 relative to 2007, holding the other variables in the model constant. The analyses use SIPP person-weights from wave 5 and employ Stata's *svy* command to account for SIPP's complex survey design (StataCorp 2009). We price-indexed earnings and DC plan contributions to 2009 dollars using the CPI-W. Table 1 presents descriptive statistics of our study sample.

Results

Table 2 presents tabulations of the prevalence of substantial reductions (at least 10 percent) in real DC plan contributions from 2007 to 2009 by the selected job characteristics in our sample of full-time private-sector workers who were DC plan participants in 2007 and who remained with the same employer throughout the recession. Several interesting patterns emerge. Overall, around 30 percent of the sample experienced substantial decreases in their contributions between 2007 and 2009. This rate, however, differed by job characteristics. Among participants in industries with relatively very low employment losses from 2007 to 2009, such as those working in educational and health services or utilities, we observed substantially fewer instances of decreased contributions compared with contributions of participants working in industries with relatively high employment losses, such as construction and manufacturing. Within the middle of the distribution of employment losses from 2007 to 2009, participants in the leisure and hospitality industry and wholesale trade had relatively high prevalence of substantive reductions in DC contributions.

Table 2. Percentage distribution of substantial reductions in DC plan contributions (2007–2009) among analysis sample, by selected job characteristics

Job characteristic	Percentage with a loss of at least 10 percent(1)	Standard error
All	30.0	0.7
Educational and health services	22.9	1.6
Utilities	20.3	5.5
Personal and other services	25.4	4.1
Leisure and hospitality	38.6	6.9
Financial activities	27.1	2.2
Retail trade	31.3	2.2
Transportation and warehousing	37.7	5.7
Mining and logging	33.1	3.9
Wholesale trade	40.7	4.3
Information	31.4	4.5
Professional and business services	26.0	2.3
Nondurable manufacturing	32.4	3.0
Durable manufacturing	34.5	2.0
Construction	34.5	3.7
Employer size in 2007		
1–49 employees	35.1	1.8
50–99 employees	30.2	2.8
100 employees or more	28.5	0.8
Job tenure in 2007		
7 years or less	29.0	1.2
More than 7 years	30.8	1.0
Union membership in 2007	37.2	2.8

Job characteristic	Percentage with a loss of at least 10 percent(1)	Standard error
Managerial or professional occupation	26.0	.9
Defined benefit pension plan	29.9	1.2
Hours change from full time (2007) to part time (2009)	35.5	3.0
Loss of at least 10 percent in individual real earnings, 2007–2009	63.2	2.0
Number	4747.0	—

Notes:

(1) Industries are shown from lowest to highest employment loss by percentage change in seasonally adjusted employment, December 2007–June 2009. These data are adapted from Christopher J. Goodman and Steven M. Mance, "Employment loss and the 2007–09 recession: an overview," Monthly Labor Review, April 2011, table 1.
Note: Data are weighted and corrected for SIPP's complex survey design.
Source: Authors' calculations using Social Security administrative records matched to 2008 Survey of Income and Program Participation data.

The prevalence of substantial contribution declines also differed by employer size. DC retirement plan participants at firms with fewer than 50 employees at the beginning of the recession had a higher propensity to have substantially reduced contributions by 2009 than participants in firms with 100 or more employees (35.1 percent versus 28.5 percent). The results also indicate that workers with union membership had above-average proportions of contribution decreases, while those in managerial and professional occupations had, on average, lower proportions of contribution decreases. The pattern of reductions in DC contributions among participants with union membership could stem, in part, from the association between union membership and blue collar occupations in our sample (we exclude public sector workers). Evidence suggests that the recession more adversely affected blue-collar workers.[44] Thus, a loss in earnings, or heightened anxiety about the economic environment, may have contributed to this pattern. No substantial variation from the average was observed by job tenure and DB pension participation. Not surprisingly, those who were working part time by December 2009 were more likely than other workers to have substantially decreased their contributions.

In addition, we found a strong relationship between declines in individual earnings and reductions in DC plan contributions. Among participants who experienced more than a 10-percent reduction in earnings from 2007 to 2009, a sharply larger proportion of reduced DC plan contributions (63 percent) occurred by 2009 than the average (30 percent).

To examine whether these relationships hold in a multivariate context, we estimated a series of probit regressions that examine the relative contribution of each job characteristic (while holding the other covariates constant) on the probability of a substantial reduction in contributions to DC retirement accounts over the 2007–2009 period. As previously discussed, we define a substantial decrease as occurring when an individual's contributions between 2007 and 2009 declined by more than 10 percent in real terms. The results (marginal effects) of four models appear in table 3. Models 1–3 are nested, in that each model extends the previous model to control for incremental effects of labor earnings measures. Model 4 uses a subset of our study sample.

Table 3. Probit regressions of substantial reduction in DC plan contributions between 2007 and 2009 among analysis sample, on selected job characteristics (marginal effects)

Independent variables	Full analysis sample			Excluding individuals with earnings reduced by at least 10 percent, 2007–2009
	Model 1	Model 2	Model 3	Model 4
Percent change in seasonally adjusted employment December 2007–June 2009 by industry (higher = less employment loss)(1)	–.005(2)	–.005(2)	–.002(5)	–.002(4)
Employer size (reference group = 1–49 employees)				
50–99 employees	–.055(4)	–.054(4)	–.055(4)	–.053(4)
100 employees or more	–.073(2)	–.074(2)	–.064(2)	–.059(3)
Job tenure above the median of 7 years	.019	.016	.001	–.016
Union membership	.053(4)	.052(4)	.047(5)	.042
Managerial or professional occupation	–.033(4)	–.039(4)	–.005	.002
Defined benefit pension plan	.007	.006	.010	.001
Hours change from full time (2007) to part time (2009)	.054(5)	.054(5)	–.001	–.027
Earnings characteristics				
Mean of the logarithm of 2007 earnings	—	.019	–.040(4)	.001
Loss of at least 10 percent in individual real earnings, 2007–2009	—	—	.425(2)	—
Demographic controls				
Married	–.009	–.011	–.014(5)	–.014
Marital status change(6)	.129(3)	.128(3)	.152(2)	.127(3)
Male	–.019	–.025	–.023	–.028(5)
Bachelor's degree	–.071(2)	–.079(2)	–.062(2)	–.063(2)
Non-White	.049(3)	.050(3)	.044(4)	.051(3)
Age (mean)	–.003(3)	–.003(2)	–.003(2)	–.002(4)

Independent variables	Full analysis sample			Excluding individuals with earnings reduced by at least 10 percent, 2007–2009
	Model 1	Model 2	Model 3	Model 4
Metropolitan area(7)	.008	.006	.004	.001
Number	4,747	4,747	4,747	3,863

Notes:

(1) The percentage job loss by industry was estimated by Christopher J. Goodman and Steven M. Mance in "Employment loss and the 2007–09 recession: an overview," Monthly Labor Review, April 2011, table 1.
(2) $p < .001$; (two-tailed).
(3) $p < .01$.
(4) $p < .05$.
(5) $p < .10$.
(6) Change in marital status between wave 1 and the end of 2009.
(7) Individual's residence is located in a metropolitan area.
Note: Data are weighted and corrected for SIPP's complex survey design.
Source: Authors' calculations using Social Security administrative records matched to 2008 Survey of Income and Program Participation data.

Model 1 estimates the job characteristics controlling for the demographic covariates but not participants' earnings characteristics. Results indicate a positive association between working in an industry with higher employment losses from 2007 to 2009 and the probability of substantially reducing contributions to DC plans over the same period. Specifically, for each percentage point by which the employment loss in a participant's industry exceeded the mean loss in the private sector (–6.6 percent), the probability of substantially reduced DC plan contributions increased by 0.5 percentage points.

As the results from model 1 show, employees who worked for larger firms from 2007 to 2009 were less likely to have reduced their contributions during that period than did workers in firms with fewer than 50 employees. Being in a managerial or professional occupation also was negatively associated with the probability of substantially reduced contributions, but union membership was associated with a higher probability. Job tenure and having a DB pension plan were not significant covariates. Changing from full-time to part-time work between wave 1 and December of 2009 was marginally significant ($p < .10$) and, as expected, was associated with a higher probability of reduced contributions.

Models 2 and 3 add characteristics related to individual earnings. Model 2 introduces participants' 2007 log earnings level. The variable is not significant and the other parameters remain similar to model 1. Model 3 adds a binary variable indicating a reduction in individual real earnings of more than 10 percent between 2007 and 2009. Introducing this variable had a large impact. Specifically, employees with a considerable reduction in earnings had a much larger probability (by 42.5 percentage points) of substantively reducing their contribution to a DC plan over the 2007–2009 period than did those with stable or increased earnings over the same period. The size of this association was, by far, the largest among all of our models.

Unlike model 2, having higher 2007 log earnings in model 3 lowered the likelihood of a substantive reduction in contributions to a DC plan, all else being equal. The association between industry-specific employment change from 2007 to 2009 and the outcome variable was in the expected direction and remained marginally significant ($p < .10$). It is worth noting that the magnitude of this variable declined in model 3 relative to models 1 and 2 because being in an industry with greater employment loss over the recession correlated with having reduced individual earnings over the same period. Additionally,

accounting for reduced individual earnings removed the significance level of having a managerial or professional occupation and lessened the significance of union membership ($p < .10$). The statistical significance and magnitude of employer size remained unchanged.

We estimated an additional model (4) to examine the relationship between job characteristics and reduced DC plan contributions for participants who had stable or increased earnings over the period. This model, which contains the same variables as model 2, excludes DC plan participants with substantially reduced earnings between 2007 and 2009 (about 19 percent of the study sample). The results are generally similar to prior models. Notably, among DC plan participants with stable or higher earnings over the period, being employed in an industry that experienced greater employment loss was associated with an increased probability of substantially reducing contributions ($p < .05$). More specifically, for each percentage point by which the worker's industry experienced employment loss above the mean, the probability of a reduced contribution increased by about 0.2 percentage point. Additionally, working for a large employer, relative to smaller employers, was associated ($p < .05$) with a decreased probability of having a reduced DC pension contribution (by around 6 percentage points). Union status and managerial or professional occupations were not significant factors.

In addition, we found a strong relationship between declines in individual earnings and reductions in DC plan contributions.

The demographic control variables also had noteworthy effects. Having a bachelor's degree had a statistically significant negative association with experiencing a reduction in contributions to a DC plan. Participants who changed marital status had a higher probability of reducing contributions. Relative to non-Hispanic Whites, non-White participants were more likely to experience a reduction in DC retirement savings, all else equal. Age was a significant negative predictor of reduced contributions. These relationships illustrate the importance of including a broad range of individual characteristics as covariates when estimating job characteristic effects on DC pension outcomes.

IN SUM, THE REGRESSION RESULTS SHOW that reduced labor earnings over the recession had the strongest association with the probability of observing a substantial reduction in contributions to DC plans, holding other variables in the model constant. Industry-specific employment change and employer size had more modest, yet significant, associations with higher probabilities of reducing contributions. Their significance, particularly when accounting for reduced individual earnings (models 3 and 4), uncovers a link between nonmonetary job factors and DC plan contributions over multiple years. Managerial and professional occupations, as well as union status, were also significantly associated with the probability of reducing DC contributions, although in opposite directions and mainly when a reduction in individual earnings was not in the model.

The factors that influence workers' retirement savings over the life course are of public policy interest. Because consistency of contributions among DC plan participants is generally important for retirement readiness, understanding how participants' contribution levels evolve over multiple years—how those levels relate to individual characteristics—is salient. In this article, we used nationally representative survey data linked to federal income tax records to trace the longitudinal change in DC plan contributions between 2007 and 2009 among a sample of full-time, private-sector workers who participated in a DC plan in 2007. Because we followed only those participants who remained with the same employer over the observation period, our results should be viewed as independent of job change and prolonged unemployment. Taken together, our results bring into focus the potential relationship between job characteristics and the contribution levels of DC participants during an economic downturn.

We found several significant differences by job characteristics in the multivariate probit models. The most dominant factor was reduced labor earnings. Specifically, having real earnings fall (by more than 10 percent) between 2007 and 2009 was associated with increasing the probability (by 42 percentage points) of observing a substantial reduction in DC contributions compared with the probability when earnings were stable or had increased (as was the case in model 3). Thus, a reduction in individual earnings seemed to go hand in hand with a drop in retirement account contributions during the recession.

We also found significant relationships between nonmonetary job characteristics and DC contribution behavior. Specifically, being in an industry with greater employment losses from 2007 to 2009 was associated with a higher probability of substantially reducing contributions over the same period, holding important covariates constant. This relationship held when the sample was restricted to workers with stable or increased earnings over the recession (model 4). The implication is that the broad environment in which a DC plan participant's job is embedded may influence his or her contribution decisions. In our case, rising unemployment in an industry may amplify job security concerns among DC plan participants in that industry, and this, in turn, influences their contribution decisions. In addition, employers in industries with heavy employment losses may take actions that may prompt reductions in employee contributions in those industries, such as reducing matching contributions. Further research on mechanisms that potentially link industry characteristics with DC contribution behavior would be valuable.

Another key factor was employer size. In all of the estimated models, participants working for a large employer had significantly lower probability of having substantially reduced contributions between 2007 and 2009 relative to their counterparts working for a small employer (less than 50 employees). This variation could reflect different perceptions of job security by employer size, particularly during a recession. On the other hand, it could reflect an association between employer size and employer matching contributions. Data constraints preclude us from knowing whether an employer's matching contribution changed over the observation period.

Finally, union membership and managerial or professional occupation had significant associations in some of the models, namely those which did not account for individual earnings changes (models 1 and 2). Jo b tenure was not significant in any of the models, and moving from full-time to part-time hours was generally not significant when covariates were taken into account.

From a public policy perspective, the results provide insights into a set of individual characteristics — in addition to the more usual characteristics considered in the literature—that may influence retirement savings behavior. Differences in the probability of experiencing a reduction in DC plan contributions over multiple years by the characteristics of a participant's job (holding important covariates constant) may indicate that retirement income security, as well as subsequent reliance on Social Security benefits, is susceptible to larger institutional and individual factors related to a participant's employer and industry characteristics.

Our results have several limitations worth noting. First, our findings may not extend to individuals excluded from our study sample. For example, including public sector workers or workers who experienced job loss or job change may alter the results presented here. Second, we examined a limited number of job characteristics. Data constraints precluded us from assessing a job's working conditions or provider-related characteristics such as financial literacy programs within the workplace or automatic enrollment. Third, our analysis should not be viewed as indicating a causal effect of job characteristics. The relationships documented here could stem from unobserved heterogeneity across individuals. For example, individuals with a higher taste for savings may be more drawn to jobs with certain

characteristics. Fourth, the observed associations between job characteristics and the outcome variable may vary across demographic characteristics, including educational attainment and age. A final issue is that job characteristics reflect only one element among many that are associated with participants' contribution decisions. Other factors, ranging from individual risk tolerance to family structure and household wealth, may shape the trajectory of contributions over participants' working lives. Plan characteristics, such as employer match, investment choice, and loan rules, are also critical.

This study represents an initial step to better understand the potential role that job-related characteristics play in DC plan contribution behavior during a period of severe economic downturn. One fruitful avenue of future research would be to identify some of the mechanisms that may link job characteristics and DC plan contribution behavior, such as plan attributes. Another useful avenue of empirical work may be to consider how changes at the household level, such as a spouse losing a job, influence retirement savings decisions. Assessment of the impact of employer matching contributions, along with the relationship between matching contributions and business cycles, also merits more research attention.

Notes

[1] See, for instance, Stephanie Costo, "Trends in retirement plan coverage over the last decade," *Monthly Labor Review*, February 2006, pp. 58–64; Angela M. O'Rand and Kim M. Shuey, "Gender and the devolution of pension risks in the US," *Current Sociology*, January 2007, pp. 287–304; and James Poterba, Steven Venti, and David A. Wise, "The changing landscape of pensions in the United States," in Annamaria Lusardi, ed., *Overcoming the saving slump: how to increase the effectiveness of financial education and saving programs* (Chicago, IL: University of Chicago Press, 2009), pp. 17–46.

[2] For example, Patrick Purcell, "Retirement plan participation and contributions: trends from 1998 to 2006," *Journal of Deferred Compensation* 14, no. 4, 2009; Gur Huberman, Sheena S. Iyengar, and Wei Jiang, "Defined contribution pension plans: determinants of participation and contribution rates," *Journal of Financial Services Research*, February 2007, pp. 1–32; Alicia H. Munnell, Annika Sundén, and Catherine Taylor, "What determines 401(k) participation and contributions?" *Social Security Bulletin,* vol. 64, no. 3, 2002, pp. 64–75; and Leslie Papke, "Choice and other determinants of employee contributions to defined contribution plans," *Social Security Bulletin,* vol. 65, no. 2, August 2004, pp. 59–68.

[3] According to the National Bureau of Economic Research, the recession began in December 2007 and continued through June 2009. Because of the breadth, depth, and length of the recession, it has been labeled the "Great Recession." See Christopher J. Goodman and Steven M. Mance, "Employment loss and the 2007–09 recession: an overview," *Monthly Labor Review*, April 2011, pp. 3–12.

[4] For example, from the fourth quarter of 2007 through the second quarter of 2009, the combined value of assets in private-sector DB and DC plans fell from $6.4 trillion to $4.7 trillion, a 26-percent decline. By the end of the fourth quarter of 2011, the combined assets of private-sector DB and DC plans had risen in value to $6.1 trillion, still $311 billion less than their combined value at yearend 2007. See *Flow of funds accounts of the United States, flows and outstandings (*fourth quarter 2008, 2009, and 2011, Board of Governors of the Federal Reserve System).

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Research, working paper no. 17547, 2011); Richard W. Johnson, Mauricio Soto, and Sheila R. Zedlewski, "How is the economic turmoil affecting older Americans?" *Fact Sheet on Retirement Policy* (Washington, DC: Urban Institute, October 2008), www.retirementpolicy.org; and Brooke Helppie McFall, "Crash and wait? The impact of the Great Recession on the retirement plans of older Americans," American Economic Review *Papers and Proceedings,* May 2011, pp. 40–44.

[6] O'Rand and Shuey, "Gender and the devolution of pension risks in the US"; and Poterba, Venti, and Wise, "The changing landscape of pensions in the United States."

[7] National Compensation Survey, employee benefits in private industry data series (U.S. Bureau of Labor Statistics), annual various years, http://www.bls.gov/ncs/ebs/.

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[10] Michael D. Hurd and Susann Rohwedder, "Effects of the economic crisis on the older population: how expectations, consumption, bequests and retirement by the older population responded to market shocks," in Maurer, Mitchell, and Warshawsky, eds., pp. 64–80; Alicia H. Munnell, Dan Muldoon, and Steven A. Sass, "Recessions and older workers," working paper no. 9-2 (Center for Retirement Research at Boston College, January 2009); and Steven A. Sass, Courtney Monk, and Kelly Haverstick, "Workers' response to the market crash: save more, work more?" working paper 10-3 (Center for Retirement Research at Boston College, February 2010).

[11] Mental accounting occurs when households assign specific purposes to particular asset classes, and the households are reluctant to use those assets for other purposes. When a household has assigned an asset to the category of retirement saving, it may be reluctant to use that asset for other purposes. For more explanation of the theory of mental accounting and empirical evidence, see Richard H. Thaler, "Anomalies: saving, fungibility and mental accounts," *Journal of Economic Perspectives*, Winter 1990, pp. 193–205; Steven F. Venti and David A. Wise, "Have IRAs increased U.S. saving?: Evidence from consumer expenditures surveys" *Quarterly Journal of Economics*, August 1990, pp.661–698; and Annamaria Lusardi, "Precautionary saving and the accumulation of wealth," working paper no. 204 (Joint Center for Poverty Research, Harris Graduate School of Public Policy Studies of the University of Chicago, August 2000).

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establishments of this size. At the same time, business establishments with 500 or more employees comprised 16 percent of all establishments and accounted for 13 percent of business deaths (U.S. Small Business Administration, Office of Advocacy, "Statistics of U.S. businesses," http://www.sba.gov/advo/research/data.html. See also Plan Sponsor Council of America, *401(k) and profit sharing plan response to current conditions*, 2011, http://www.psca.org/401k-survey-response-to-current-conditions.

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[38] One-fourth of the SIPP sample is interviewed every month, and each interview asks about events that occurred in the previous 4 months.

[39] On the basis of agreements between the Social Security Administration (SSA) and the Census Bureau, SSA administrative records are linked to SIPP panels and are available for research purposes on approved projects at restricted data sites. About 90 percent of respondents in the 2008 panel have their survey reports matched to their own SSA W-2 records. The matched and full SIPP samples are consistent across a range of key characteristics.

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[41] For example, the relationship between employer size and DC plan participants' level of contributions may vary between private and public-sector workers. Also, compared with private-sector workers, state and local workers are more likely to participate in a DB plan as well as a DC plan, have higher rates of union membership, and have retirement plans whose terms sometimes can be changed only by enacting a new law. Most importantly, because the majority of state and local government employees participate in defined benefit pensions, their DC plans are typically supplemental plans.

[42] About three-quarters (78 percent) worked for the same employer at the start of the SIPP and in December 2009.

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