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**Earnings Experience and its Impact on 401(k)
Contribution Behavior: The Roles of
Earnings Shocks, Spousal Behavior
and Pension Plan Details**

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Earnings Experience and its Impact on 401(k) Contribution Behavior:
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Abstract: (100 words) By linking SIPP data to SSA administrative records from 2009 and 2012 this study finds asymmetric employee 401(k) contribution responses depending on whether their real earnings increased or decreased. The study also finds workers adjust their 401(k) contributions in response to changes in their spouse's contribution behavior. Finally, employers adjust 401(k) rules and contribution rates frequently and these changes affect 401(k) employees' behavior. We conclude that while workers may tend toward taking a path of least resistance, economic shocks, spousal behavior, and changes in pension plan details continuously cause 401(k) contributions to change in patterns not consistent with inertia-dominating behavior.

JEL codes: D14, J26, J32

Key Words: Private pensions, non-wage compensation, 401(k) plans, investment behavior, retirement savings

¹ The views expressed in this paper are those of the authors and do not represent the views of the Social Security Administration.

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Inadequate Retirement Income, Fear, and 401(k) Plan Features

The U.S. retirement income security system relies on workplace retirement systems to help employees accumulate retirement savings that supplement Social Security benefits and private savings. Studies in the retirement savings literature point to the prevalence of ‘inertia’ when it comes to describing retirement savings behavior, as workers make decisions consistent with taking “the path of least resistance” because it is the “easiest” thing to do.

At the same time, behaviorists have long known that fear is one of the most powerful human motivators; fear, and the anxiety it engenders, create a psychological, physiological, and behavioral human state that is induced by threats to well-being or survival. Specific behavior patterns facilitate coping with an adverse or unexpected situation.⁵ As a result, negative economic shocks will trigger a different reaction than positive wealth and earnings trends and shocks.

This study evaluates the determinants of employee 401(k) contributions and analyzes whether workers who experience a negative earnings shock exhibit different retirement savings behavior than those who do not. Using data from the Survey of Income and Program Participation (SIPP) linked to Social Security Administration (SSA) administrative records from 2009 and 2012, the study finds employee 401(k) contributions and their determinants depend on

⁵ Steimer, T. (2002). ‘The Biology of Fear and Anxiety-Related Behaviors’ Dialogues in Clinical Neuroscience. Sep 2002; 4(3): 231–24

whether times are good or bad. It also finds that workers adjust their 401(k) contributions in response to changes in their spouse's behavior. Finally, even for workers in the same job over a three-year period, employers adjust 401(k) rules and contribution rates somewhat frequently, and these changes affect 401(k) accumulations.

The study concludes that though employees may tend to take the path of least resistance and inertia exerts a powerful influence on behavior, anxiety can overcome inertia. Economic shocks, spousal contribution behavior, and changes in pension plan details induce frequent adjustments to voluntary 401(k) contributions. Inertia, fear responses, and cooperation and shared values with spouses are all strong behavioral traits that need to be considered in forming employer plans that better supplement Social Security's annuity and help boost retirement income security for most workers.

The Debate on Inertia and Action Biases in 401(k) Plans

Madrian and Shea (2001) and Choi, Laibson, Madrian and Metrick (2002) discovered an important regularity about retirement savings behavior that they refer to as inertia. They found evidence that workers make decisions consistent with behavior that takes "the path of least resistance" because it is the "easiest" thing to do. Accordingly, inertia studies advise employers and policy makers to leverage this widespread behavioral trait by automatically enrolling new hires and gradually increasing their contribution rate over the course of employment because "inertial tendencies" will boost savings rates beyond what they would have been without these automatic features. The idea behind auto features is to lower the costs of deciding to save. The

inertia literature⁶ concludes that employers and policy makers can increase savings in voluntary, individual-directed and commercially based 401(k) plans by promoting several key plan design features, such as auto-enrollment and sophisticated default options, that manipulate (but not coerce) workers to save and invest adequately.

Alongside the inertia literature, there is another literature that links economic shocks to changes in the physical state that affect behavior. Economists identify a positive relationship between the stress of economic insecurity and deteriorating health (Diette, Timothy M., et al. 2012, Flatau, Paul, June Galea, and Ray Petridis. 2000, Fenwick and Tausig, 1994) but the direction of causation is unclear. Medical researchers conducted a meta-analysis of several studies considering the positive relationship of unemployment with suicide, taking into account the possibility that people with mental health issues may be more at risk of losing their jobs. Controlling for prior mental health, researchers still found a relationship between unemployment, poor mental health, and suicide as a consequence of unemployment (Milner, Page and LaMontagne 2014.) Ruhm (2006) concludes unemployment produces less air pollution and traffic fatalities so the health of the general population improves in macro economic downturns. However, Ruhm finds that the independent effect of job insecurity and income loss on stress is positive after accounting for the positive effects of not having a job with unsafe working conditions, job commutes, and more pollution caused by a healthy economy. Stress from

⁶ Choi, et. al (2004) use seven large firms' reports of how their collective 200,000 workers responded to employers' match decision, eligibility rules, and 401(k) investment options. The paper concludes that match levels and thresholds are not as important in inducing savings as auto enrollment and auto-escalation features are. Similar to their results, we find that the match rate and the existence of the match do not induce changes in contributions or levels of contributions.

unemployment mitigates the healthy effects of less pollution and fewer commutes on physical and mental health.

At the same time, Tamborini, Purcell and Iams (2013) find that workers in industries with large unemployment losses were more likely to reduce their defined contribution (DC) plan contributions in the 2007-2009 recession. The workers in their sample did not necessarily experience an unemployment spell, but they changed their contribution behavior in response to a fear of becoming unemployed in the future induced by a higher incidence of unemployment in their industry. This links macroeconomic shocks to a change in economic behavior. We take this concept further by positing that economic shocks affect the sensitivity of employee contribution behavior to its determinants.

Dushi and Iams (2015), Muller and Turner (2011), Butrica and Smith (2014) as well as Tamborini, Purcell and Iams (2013) challenge the passive hypothesis that underlies the assumption that inertia is a key behavioral response by finding some workers, under some circumstances, are biased towards action in their 401(k) plans, not towards inertia. Dushi and Iams (2015) find that job changes and earnings losses lead to an increase in the probability of stopping contributions, and to a decrease in contribution amounts and contribution rates. Muller and Turner (2011) uncover that workers buy stocks when values are rising and sell or stop buying when values fall (which ignores all professional advice and is better described as herd behavior). Butrica and Smith (2014) find that employee participation and contributions respond to macroeconomic conditions and to spousal behavior.

This study expands on these findings and claims that earnings shocks change the sensitivity of retirement savings contribution behavior to earnings, pension plan details and spousal behavior. It also improves on previous studies in the literature by using a longitudinal

sample, which facilitates an analysis of changes in retirement contribution behavior controlling for idiosyncratic differences in preferences across workers. Finally, because it has information on pension plan details at two periods of time, it permits an analysis of the effect of changes in pension plan details on employee contribution responses. Similar to the studies cited above, this study's findings question the relevance of the passive hypothesis in explaining retirement saving behavior in the face of changing earnings, spousal behavior and pension plan details, while introducing a new motivator, fear based on previous earnings experience, to explain employee retirement savings behavior.

Data and Methodology

The Survey of Income and Program Participation (SIPP) linked to administrative earnings records from the Social Security Administration (SSA) identify changes in workers' 401(k) contributions controlling for earnings shocks, changes in spousal behavior, and changes in pension plan details. The SIPP is a nationally representative household based survey conducted in national panels with sample sizes ranging from 14,000 to 52,000 interviewed households. Respondents are surveyed every four months (every four-month period is referred to as a wave) for the duration of the panel, which ranges from 2 ½ years to 4 years. Each wave consists of core questions asked in each wave, and additional modules, specific to that wave. The retirement expectations module was fielded twice in the 2008 SIPP panel, once in wave 3 (April-July 2009 which was at the official end of the recession) and a second time in wave 11

(December 2011-March 2012, three years into the recovery)⁷ creating a longitudinal dataset on pension plan details and employee behavior for respondents who remained in the SIPP 2008 panel from wave 3 through wave 11. The module contains information on the types of retirement accounts respondents participate in (and if they do not participate – their reason for non-participation), retirement account plan details, and worker contribution behavior in those accounts. The timing of this data coincides with the recovery period following the Great Recession⁸ and reveals how workers changed their retirement contributions from the moment the Great Recession ended until three years later. Using the data from SIPP 2008 panel, waves 3 and 11, 401(k) decisions made by employees and employers in 2009 are compared with those made in 2012. The sample includes private sector workers with linked earnings records who were ages 21-68 in 2009, were employed in only one job in 2009 and 2012, and were eligible to participate in their employers' 401(k) plan in both years.⁹ Results did not differ if the sample was restricted to full time workers.

Sample restrictions: 1. Age 21-68 in 2009, 24-71 in 2012

⁷ All previous panels of the SIPP only fielded the retirement expectations module once. The 2008 panel was the first to field the retirement expectations module twice, thereby giving a longitudinal data set on pension plan details and behavior. Although there are other data sets that ask questions on pension plan participation and behavior, none have as much detail as the SIPP. The Panel Study of Income Dynamics (PSID) does not have pension plan details, like whether the plan allows loans or investment choices, or respondent details, like spousal behavior, or as large a sample size and geographic coverage. The Survey of Consumer Finances (SCF) does not have much demographic detail or state specific coverage and cannot trail spousal behavior.

⁸ The National Bureau of Economic Research (NBER) dated the Great Recession from December 2007 through March 2009.

⁹ Respondents were deemed eligible to participate in a retirement plan if they participated and made positive contributions, if they responded that they participated, even though their contributions were not positive, or if they stated they did not participate but gave reasons for not participating that were consistent with choosing not to participate (as opposed to not being eligible.) See the appendix for a more detailed description of the sample and its size.

2. in SIPP sample continuously from wave 3 - wave 11
3. matched to earnings records
4. private sectors workers
5. worked in only one job in 2009 and in 2012
6. were eligible to participate in a retirement savings plan at work both in 2009 and 2012

Linking SIPP data to Social Security administrative earnings records yields more accurate measures of earnings and retirement account contributions. A comparison of median self reported earnings and employee contributions with actual values shows that employees' median self-reported earnings are lower than actual median amounts for top earners (see Table 1) and the difference between the self reports and the actual data has grown over the time period. Moreover, self reported employee contributions consistently overstate actual contributions for all workers in the sample, though the discrepancy is significantly larger for the lower earners. Because of the discrepancy between self reported and administrative records of earnings and employee contributions, 401(k) behavior research relying on self-reports of employee contribution rates and earnings could be inaccurate; administrative data are recommended (Dushi and Iams 2010).

Using administrative data, workers in the top 25% of the income distribution experienced a 3% increase in real median earnings while the bottom 75% experienced a 4 percent increase. Yet both groups dropped their contribution rates by 2% and 15%, correspondingly, which is somewhat unexpected in a recovery because the life cycle hypothesis would predict more savings in a recovery and less in a recession, (see Table 1).

Table 1
Earnings and Contribution Changes 2009 to 2012

in the Self-Reports and Administrative Record

	Top 25% of earnings (2009 Earnings \geq \$58,072; 2012 Earnings \geq \$63,348)				Bottom 75% of earnings (2009 Earnings $<$ \$58,072; 2012 Earnings $<$ \$63,348)			
	Real Earnings (Medians)		Employee Contributions (Medians)		Real Earnings (Medians)		Employee Contributions (Medians)	
Year	Actual	Self-reported	Actual	Self-reported	Actual	Self-reported	Actual	Self-reported
2009 (\$2012)	\$88,004	\$79,944	5.4%	6%	\$29,082	\$29,880	2%	5%
2012	\$90,950	\$77,784	5.3%	6%	\$30,158	\$30,000	1.7%	5%

Source: SIPP 2008 Panel survey data matched to data from the SSA administrative record. The sample includes respondents ages 21-68 in 2009 whose information was matched to the administrative record data, and who were working one job and had non-negative earnings. The sample consisted of 26,254 observations on earnings, 15,695 observations on actual employee contribution rates, and 9,822 observations on self-reported employee contributions. The 2012 Sample includes respondents ages 23-72 whose information was matched to the administrative record data, and who were working one job and had non-negative earnings. The sample consisted of 19,858 observations on earnings, 12,951 observations on actual employee contribution rates, and 9,674 observations on self-reported employee contributions.

Two baseline cross-section regressions – one for the entire sample and the second for married workers, for 2009 and 2012 separately -- identify factors influencing an employee's 401(k) contribution rate. The dependent variable is employee contributions as a percentage of salary. Factors affecting employees' choices include workers' earnings, proxies for fear of job loss, household structure and income, life changes, and pension plan design features.

Fear of job loss is proxied by indicators of whether the respondent spent any time unemployed, on layoff, or out of the labor force in the three years spanned by the sample,¹⁰ as

¹⁰ Unemployment refers to not having a job but looking for one; Being on layoff is defined as having a job but not getting paid while on layoff; Out of the labor force indicates the worker does not have a job and is not looking for one. We do not distinguish between voluntary and involuntary spells out of the labor force.

well as the number of weeks spent unemployed, the number of weeks spent on layoff, and the number of weeks spent out of the labor force. This measures the impact of being exposed to each of these labor market states, and the differential impact of the exposure depending on its length. We expect that exposure, as well as the length of the exposure to these labor market states, would decrease the contribution rate.

Pension plan design details include whether the employer contributes in any way to the pension plan, whether the employer's contribution depends on the employee's contribution, the amount of the employer's contribution rate, whether the pension plan allows participants to take out a loan against retirement balances, and whether participants can choose how funds in the retirement account are invested. These pension plan details were chosen based on availability in the SIPP data and on the fact they were discussed in Choi, Laibson and Madrian (2004) as contributing to 401(k) savings outcomes.

A second set of regressions identifies factors influencing *changes* in contribution rates and contribution levels and tests for asymmetric responses to factors determining workers' contribution rates when real earnings fall or are stable or increasing. Analysis of married individuals' behavior identifies the effects of spousal behavior.

We also evaluate the extent of change in pension plan details for workers in the same job from 2009 through 2012 and find a significant amount of change in pension plan rules and in employer contribution rates, even for the limited time-period and sample we look at. We conclude in the last section.

Results

Data description and cross tabulations

An important contribution of this study is the insight that the sensitivity of employee 401(k) contribution behavior to life events, spousal behavior and plan design depends on whether workers' earnings fell or rose. Just over half, 54 percent, of the sample experienced stable or increasing real earnings between 2009 and 2012; the remaining 46 percent experienced a drop in real earnings (See Table 2). Workers who experienced a drop in real earnings were slightly more likely to have experienced a drop in their hours worked (29 percent compared to 20 percent) and less likely to have increased their hours of work (19 percent compared to 30 percent) than those who experienced rising real earnings. Earnings losers were slightly more likely than earnings gainers to leave a job with long tenure, defined as losing more than five years of tenure between 2009 and 2012¹¹ (12 percent compared to 8 percent). Differences in job churning between earnings losers and gainers were not great; notably most workers stayed at their same job, 81 percent of earnings gainers and 80 percent of earnings losers. When earnings grew or stayed constant, workers increased their median contribution rates from 4.1% to 4.3% and their median real contribution amounts from \$1,791 to \$2,295. On the other hand, when earnings fell, workers decreased their median contribution rates from 4.3% to 3.8% and their median real contribution amounts from \$1,709 to \$1,421.¹² This supports the narrative that employee 401(k) contribution behavior differs by earnings experience.

Table 2
Contribution Behavior of the Eligible Workers by Income Changes

¹¹ A person with 15 years of tenure in 2009, and who changes jobs in the three-year period, would report losing between 14 and 12 years of tenure.

¹² Note that when earnings fall, the percentage of salary contributed increases even if workers keep their contribution amount the same or even lower their contribution amount a little. For this reason, we also tabulate the contribution amounts to highlight that for those with earnings declines, contribution amounts actually fell.

	Workers whose real earnings grew or stayed the same	Workers whose real earnings fell
Experienced a drop in hours worked	20%	29%
Increased hours worked	30%	19%
Lost 5+ years of tenure	8%	12%
Kept the same job	81%	80%
Median earnings level in 2012	\$49,885	\$37,395
Median change in earnings	\$5,602	-\$3,931
Number of workers (un-weighted)	3,839	3,424
Number of workers (weighted)	15,686,766	13,511,302
Median employee contribution rate 2009	4.06%	3.96%
Median employee contribution rate 2012	4.30%	3.83%
Median employee real contribution amount 2009	\$1,791	\$1,709
Median employee real contribution amount 2012	\$2,295	\$1,421
Number of observations on contributions (un-weighted)	2,447	2,106
Number of observations on contributions (weighted)	9,983,530	8,400,876

Source: SIPP 2008 Panel data on respondents who were in waves 3 through 11, whose information was matched to administrative records, who were ages 21-68 in 2009, and were working one private sector job in both 2009 and 2012. Real amounts are denominated in \$2012.

Of course, cross tabulations do not control for other factors affecting contributions. For that, multivariate analysis separates the sample into earnings gainers and earnings losers and analyzes the determinants of savings behavior between the two groups.

Cross sectional results

A cross sectional regression identifies the baseline determinants of employee 401(k) contribution rates for 2009 and 2012 for the entire sample and for married individuals separately (See Tables 3a and 3b in the appendix for the results). Being widowed, divorced, or separated, Black or Hispanic lowered contribution rates, perhaps because of liquidity constraints not otherwise measured by the earnings variable. Being white or Asian, older and married predicted higher 401(k) plan contributions. Working in a large firm also had a large effect, boosting contribution rates, as well as having health insurance coverage, longer hours of work, and having longer tenure on the job. Plan design features mattered. Allowing loans – which measures a desire for liquidity – predicted a higher contribution rate. Also, the feature that employees can make investment choices in their plan was correlated with higher contribution rates. Similar to other studies (Choi, Laibson and Madrian 2004¹³, Kusko, Poterba and Wilcox 1998, Mitchell, Utkus and Yang 2005, Dworak-Fisher 2008) we found that the level of employer matches was not significantly correlated with employee contributions.¹⁴ Earnings levels did not have a significant impact on employee contribution rates in 2009, but by 2012, higher earnings levels predicted lower contribution rates. Finally, household wealth predicted a higher employee contribution, while receiving government benefits and having children under the age of 18 led to smaller employee contribution rates.

Married workers responded similarly to the factors described above, except for the employer contribution rate, which did encourage higher employee contributions, but only in

¹³ They provide an excellent review of previous literature on this subject.

¹⁴ Others found that employer matches did matter quite a bit for middle-income workers under certain circumstances (Engelhardt and Kumar 2007).

2009 (Table 3b). Moreover, married workers reacted strongly to their spouses' contribution rates. Spousal behavior complemented, rather than substituted for, spouses' behavior. When spousal rates increased, the employee's contribution increased as well, and the complementary effect was stronger in 2009 than in 2012. This means a worker's response was amplified by their spouses' behavior, making contribution rates more reactive and less stable.

Asymmetric Effects: Workers Respond Differently When Earnings Increase and Decrease

Cross sectional results do not control for individual differences in respondents' propensity to contribute to their retirement plan. For example, finding that workers in big firms have higher contributions could mean that workers who select into large firms are savers or that large firm features induce more contributions. Examining the behavior of the same people over time controls for unobserved individual differences and helps distinguish cause and effect. The next regressions use longitudinal data to determine the impact of changes in life events, job and pension plan details and spousal behavior on changes in employee 401(k) contribution rates¹⁵ for the same individuals across two time periods.

As mentioned above, one of this study's most important contributions is finding workers react asymmetrically to life, economic, and plan design feature changes depending on whether their earnings were stable, increasing, or falling. To draw out this effect, we run a baseline

¹⁵ We split the sample based on how respondents reported their contributions in the SIPP survey, either as a fraction of their income or as a flat amount. We found similar results for both sub-samples. Therefore, all results that follow use the whole sample and all contributions are reported as a fraction of income or a rate (for those who report a flat amount, that amount was converted into a fraction of earnings).

regression that includes the whole sample, while two sub-regressions split the sample based on whether respondents' real earnings increased or decreased (see Table 4, below).

Contribution rates fell as earnings increased for those who had stable or growing earnings, but they rose for the 48% who experienced earnings losses. For those whose earnings rose, the impact of an increase in earnings on contribution rates is estimated by comparing the relative changes in contribution rates with the relative increases in earnings experienced across workers. Likewise, for those whose earnings fell, the impact of an increase in earnings on contribution rates is estimated by comparing the relative changes in contribution rates with the relative decreases in earnings experienced across workers. The negative estimated coefficient on earnings for workers in the former group means that earnings increases led to a decrease in their contribution rates, or that their earnings gains were associated with a decrease in their contribution rates. The positive estimated coefficient on earnings for workers in the latter group means that any earnings increases would have led to an increase in their contribution rates, or that their earnings losses were associated with a decrease in their contribution rates.

The size of the earnings effect is also interesting. The coefficient on earnings is close to zero for those with stable or increasing earnings, which might indicate that contribution behavior is inertial for this group, perhaps because they save a target amount or their contributions run into the maximum allowed by tax rules. But, those whose earnings fell actively reduced their contribution by 3% (the coefficient on earnings as a percentage of the median contribution amount), possibly to maintain liquidity needs or living standards, contrary to the inertia narrative.

For those who experienced stable or increasing earnings, only two plan design changes affected contributions: whether the firm allowed 401(k) loans and whether the firm's match depended on the employee contribution. If an employer allowed loans from a 401(k) plan the

employee increased his or her contribution rate by .45 percentage points, or 11%. If the employer match depended on the employee's contribution, employee 401(k) contributions dropped by 0.63 percentage points (a 16% drop). The positive impact on contributions of allowing loans from 401(k) plans for earnings-gainers suggests this group may regard their 401(k) as a source of liquidity, a result predicted by the lifecycle model of savings: transitory income is intended for short-term consumption goals (Browning and Lusardi 1996.) Workers who experienced real earnings losses did not increase their 401(k) contributions in response to changes in the design of their 401(k) that make their 401(k) more accessible. In fact, none of the changes in 401(k) design features affected workers who experienced fear, proxied here by having lost real earnings. Again, employer contributions did not influence employee contributions for either earnings losers or gainers.

Between 2009 and 2012, workers' employer firm size could have increased, decreased, or stayed the same. An increase in firm size resulted in higher employee contributions by a significantly large factor, 0.91 percentage points, but only for those whose earnings grew or remained stable¹⁶. Not all firm size changes were due to a change in jobs. In fact, 74% of workers who reported a decrease in firm size were working for the same employer over the time period, while 59% of those reporting an increase in firm size were in the same job. In other words, employer firm size does change a good deal over the three-year period. The logic for the effect of firm size on employee contributions is thus not necessarily an indicator of a change in workplace culture that might come with a change in employer, but a reflection of some other

¹⁶ In the reported specification, firm size was coded as a categorical variable with values of -1 if the respondent's firm size shrank, 0 if the firm size remained the same, and 1 if the firm size grew. Results were qualitatively similar when changes in firm size were coded using dummy variables for each change.

change in the firm as a result of its growth. This finding concurs with Dushi et al. 2015, who finds that the effect of firm size is due to differential eligibility for the firm's pension plan by firm size.

Time spent out of the labor force, or on layoff, reduced employee contributions for those whose earnings grew or remained flat. The length of the out-of-the-labor-force spell induced a small increase in contributions for earnings gainers in what we interpret as attempts to catch up on contributions. The size of the coefficient on the dummy noting any time spent out of the labor force is -3.37 percentage points, a reduction in contribution rates of 83 percent, and the largest in the regression for earnings gainers. These results suggest fear greatly affects retirement savings since being out of the labor force or experiencing an unemployment spell reasonably engender fear of future repeat experiences.

For earnings losers only earnings changes and unemployment experience affected contributions. For every \$10,000 of earnings lost, contribution rates dropped by 0.13 percentage points (3 percent), while every additional week of unemployment decreased their contribution rate by 0.11 percentage points (2.7 percent). These results suggest a scarring effect of an unemployment spell on the worker and on retirement savings, even after it is over.

Changes in household wealth, health insurance coverage, marital status or in the number of children under age 18 in the household did not affect employee contributions, likely because in three years these factors did not change considerably. These variables are not reported in Table 4.

The difference in coefficients by earnings experience is statistically significant for five of the independent variables included in the regression models, though a test of whether all the coefficients are statistically the same cannot reject that hypothesis.

Table 4
OLS Regression Determining the Factors Affecting Contributions for Employees with Stable or Increasing Earnings and Workers with a Drop in Earnings

Dependent variable: change in employee contribution rate between 2009-2012	Baseline			Those who experience Increasing or stable real earnings			Those who experience Falling real earnings			Diff#
Change in Earnings (\$10,000)	-0.02	0.01		-0.02	0.01	**	0.13	0.07	**	***
Employer match depends on employee contribution	-0.24	0.19		-0.63	0.23	***	0.16	0.33		**
Plan allows loans	0.39	0.18	**	0.45	0.20	**	0.14	0.32		
Firm size: 1: moved to a large firm, 0: same firm size, -1: moved to a small firm	0.48	0.27	*	0.91	0.31	***	-0.23	0.48		**
Number of weeks spent unemployed	-0.07	0.03	**	-0.01	0.04		-0.11	0.05	**	
Number of weeks spent out of the labor force	0.13	0.04	***	0.17	0.05	***	0.03	0.08		
Number of weeks spent on layoff	-0.01	0.04		-0.08	0.05	*	0.06	0.06		*
Spent any time out of the labor force	-2.12	0.83	***	-3.37	0.89	***	-0.02	1.66		*
Divorced	-1.40	0.82	*	-1.03	0.94		-1.17	1.49		
Intercept	0.46	0.13	***	0.49	0.15	***	0.59	0.26	**	
Observations	1875			1051			824			
R-squared	0.02			0.05			0.03			

Source: SIPP 2008 Panel survey data matched to data from the SSA administrative record.
Test of insignificant difference in ALL coefficients and intercept across the two sub-samples
F-statistic: 1.36 Prob >F: 0.12

tests the significance of the difference between the coefficient from the stable/increasing earnings against the coefficient from the falling earnings sample. *** indicates that the difference is significant at the 1% level, ** for the 5% level, and * for the 10% level.

Married Workers

Approximately 60% of the sample is married (see Table 5). The spousal contribution rates were 4.1% in 2009 and 3.8% in 2012, and more than half of the spouses participated in a DC plan.

Table 5
Significant Changes in Spouse's Behavior Between 2009 and 2012 for married workers

	All workers age 21-68 in 2009		All workers age 24-71 in 2012	
	2009	#	2012	#
Fraction of households who are married	60%	164,984,495	61%	163,730,390
Spousal DC plan participation	52%	50,725,138	61%	50,121,988
Mean Spousal employee contribution	4.1%	46,822,458	3.8%	48,792,807

Source: SIPP 2008 Panel survey data matched to data from the SSA administrative record. Sample is workers in the matched SIPP/admin data sample who were age 21-68 in 2009, and workers in the matched SIPP/admin data sample who were age 24-71 in 2012.

A worker's 401(k) contributions complement their spouse's contribution behavior. When the spouse reduced his/her contribution or when the spouse started participating, so did the reference person (see Table 6).

Table 6
Employee's 401(k) Savings is Complementary to their Spousal Savings Behavior

All eligible workers in 2009 and 2012 who were married in both periods	Average change in spousal contributions
Did not contribute either year	0.006
Were not contributing in 2009 but were contributing in 2012	0.003
Were contributing in 2009 but stopped contributing by 2012	-0.009
Contributed both years	0.004
Total	5,434,020

Source: SIPP data on respondents who were in waves 3 through 11, whose information was matched to administrative records, who were ages 21-68 in 2009, were working one private sector job and were married in both 2009 and 2012.

The baseline regression and the asymmetric regressions for married people control for the additional effect of spousal behavior on an employee's contributions. The regression results are similar between married people and the whole sample, especially with regard to the asymmetry of the earnings effect (see table 7, below).¹⁷ In addition, the study finds spousal behavior significantly impacts workers' behavior. Workers who experienced stable or increasing real earnings complemented their spouses' behavior; a higher spousal rate increased the workers' rates by .12 percentage points (3 percent of the median contribution rate for earnings gainers). Savers act like the savers they married in good times. On the other hand, the contribution rates for workers who experience reduced earnings were not affected by their spouses' contribution

¹⁷ The married sample specification was more parsimonious because of the smaller sample size. It included the changes in earnings, the state unemployment rate, whether the employer match depends on the employee's contribution, whether the employer allows loans from the DC plan, whether the employer allows employees to choose their DC plan investments, the employer contribution rate, changes in firm size (increase, decrease or stayed the same), weeks spent unemployed, weeks spent out of the labor force, spousal hours of work and spousal contribution rates. Only variables with significant coefficients were included in the table. Though the parsimonious specification reported above does not include the effect of having spent ANY time out of the labor force, the full specification result did find a significant effect of that variable, similar to the result in the total sample.

rates. Our confidence in this finding is muted because there is no significant difference between the coefficient on spousal contribution rates for earnings gainers or losers, likely because the sample sizes are small.

Table 7
OLS Regression Determining the Factors Affecting Contributions for Employees with Stable or Increasing Earnings and Workers with a Drop in Earnings among married workers

Dependent variable: change in married employee contribution rate between 2009-2012	Baseline			Those who experience increasing or stable real earnings			Those who experience falling real earnings			Diff
Change in Earnings (\$10,000)	-0.05	0.07		-0.22	0.09	**	0.10	0.11		**
State specific unemployment rate	-0.14	0.18		-0.40	0.20	**	0.18	0.31		
Plan allows loans	0.87	0.39	**	0.81	0.42	*	0.91	0.69		
Maintained firm size (omitted: firm size shrank)	0.46	0.58		1.21	0.68	*	-0.33	0.98		
Change in spouse's employee contribution	0.11	0.05	**	0.12	0.05	**	0.08	0.10		
Intercept	0.42	0.28		0.34	0.32		1.02	0.53	*	
Observations	556			296			260			
R-squared	0.03			0.10			0.02			

Source: SIPP 2008 Panel survey data matched to data from the SSA administrative record.
Test of insignificant difference in ALL coefficients and intercept across the two sub-samples
F-statistic =0.92, Prob>F=0.52

tests the significance of the difference between the coefficient from the stable/increasing earnings against the coefficient from the falling earnings sample. *** indicates that the difference is significant at the 1% level, ** for the 5% level, and * for the 10% level

Employer behavior

Our results coincide with other findings that changes in employer pension plan details have a significant impact on employee savings rates.¹⁸ Below, we measure the extent employers change plan design using the administrative data merged with the SIPP longitudinal sample. We limit the sample to respondents age 21-68 in 2009 who were working only one job in the private sector *for the same employer* in 2009 and 2012. We also limit the sample to non-imputed observations on pension plan details to make sure the changes in pension plan details are not due to imputation error. Results are in table 8, which tabulates pension plan changes. Employers reliably contributed over the entire period -- 94% did not stop or start contributing something. But most employers changed their contribution rates over the three-year period. Only 28 to 38 percent of employers maintained their contribution rates. In addition, only 78 to 80 percent of employers maintained plan design features, while anywhere from 8 to 12% changed at least one plan design feature. This leads us to conclude that inertia does not describe employer behavior.

This high level of employer activity influences employee contributions. Employers change their 401(k) behavior, and other labor compensation decisions, in response to external economic pressures, shareholder needs, and labor market conditions. In addition, the caps on employer matches affect their contributions over the cycle.¹⁹ The high level of employer activity in changing 401(k) features warrants further study because employers' decisions affect employee retirement savings behavior.

Table 8. Employers Change 401(k) plan features

¹⁸ Choi, Laibson and Madrian (2004) give an excellent review of the literature on pension plan details up to 2004.

¹⁹ Employers typically follow a schedule of contribution rates that decrease as earnings increase, up to a cap. Changes in earnings automatically trigger a change in the contribution rate when the earnings cross a threshold.

Changes in pension plan details 2009-2012 for those in the same job			
Pension Plan Details	Decrease	No Change	Increase
Employer contribution rate when the employee contributes a percentage of their earnings	23%	28%	49%
Employer contribution when the employee contributes a flat amount	19%	38%	43%
Pension Plan Details	Stopped offering this feature	Continued offering this feature	Began offering this feature
Employer contributes to the 401(k)	3%	94%	3%
Employer match contingent on employee behavior	8%	80%	12%
401(k) allows loans	10%	78%	12%
401(k) allows investment choice	9%	80%	10%

Source: Administrative data merged with the SIPP longitudinal sample. Sample is limited to respondents age 21-68 in 2009, who were working only one job in the private sector for the same employer in 2009 and 2012. Sample is limited to employers who contribute in the same manner both years (a rate versus a flat amount), and whose pension plan detail information derived from non-imputed data.

Conclusion and Policy Implications

Life and market events affect worker contributions to 401(k) plans. Just as inertia is an important feature of workers' retirement savings behavior, we find that 401(k) contributions depend crucially on whether workers' real earnings grew, stayed the same, or fell over the preceding time period. Spousal behavior importantly amplifies, rather than backstops or modulates, workers' decisions to increase or decrease contributions. A worker going through a

bad patch who cuts their 401(k) contribution is likely to have a spouse who also cuts her or his savings, causing household retirement security to fall even further. Finally, our unique dataset highlights the amount of change that occurs in employer 401(k) plan details. More research on the determinants of employer behavior is needed.

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Data Appendix:

The administrative earnings records from SSA give total personal earnings for each individual. In order to identify each respondent's DC plan contributions as a percentage of earnings, we limited the sample to workers who had only one job.

Employee contributions were from the administrative record. Respondents were coded as having a zero contribution if they stated in the SIPP sample that they did not participate in the pension plan for voluntary reasons (reasons 6-14). Respondents were also coded as having zero contributions if they stated that they did participate in a DC plan, but there was no record of a contribution in the administrative record.

The data comes from the 2008 panel of the SIPP, waves 3-11, matched with administrative earnings records from SSA. First, wave 3 data was merged with administrative records. In that process, 46,433 observations were not matched (27,653 from the SIPP sample, 18,780 from the administrative data sample), leaving us with 67,599 observations. Of these observations, only

21,565 had information on DC plan contributions (they responded to the contribution question or they did not respond but indicated that they were eligible to participate in a DC plan).

Next, wave 11 data was merged with administrative records. In that process, 56,960 observations were not matched (24,341 from the SIPP sample, 32,619 from the administrative data sample), leaving us with 53,760 observations. Of these observations, only 18,316 had information on DC plan contributions (they responded to the contribution question or they did not respond but indicated that they were eligible to participate in a DC plan).

When the wave 3 sample was merged with the wave 11 sample, 25,787 observations were not matched (19,813 were no longer in the sample – sample attrition), leaving us with 47,786 observations. Of these, 15,607 had responses to the employee contribution question in 2009, and 16,364 had information on employee contributions in 2012.

An additional 24,066 observations were dropped because there was no information for them on their employment status for all the waves in between waves 3-11, and 47 more observations were dropped because they did not match with waves 4 and 10, which we use to record assets information. This leaves us with a total sample size of 37,784. These are respondents who were in the SIPP sample and the administrative data from 2009 through 2012, and had assets information and employment status recorded.

Once we limit the sample further to those who were working in both wave 3 and wave 11, we drop 17,981 observations. The age restriction costs an additional 1,507 observations, and the

requirement that respondents have only one job both periods costs 7,488 observations. Finally, limiting to private sector workers leaves us with 3,545 fewer observations. At that point, the weighted sample size is 15,686,766, of whom only 10 million are eligible to participate in a DC plan at work both years.

Appendix Table 3a
 Baseline Regression: Significant Determinants of Employee's Contributions
 for 2009 and 2012²⁰ for the whole sample

Dep. Var.: Employee contributions to a DC plan as a % of salary (1%=1)	2009, All			2012, All		
	b	SE		B	SE	
Demographic variables						
Age	0.05	0.01	***	0.06	0.01	***
Race - White omitted						
Black	-1.26	0.28	***	- 1.08	0.27	***
Asian	1.53	0.37	***	1.00	0.36	***
Hispanic	-1.18	0.31	***	- 0.75	0.30	***
Other	-1.31	0.49	***	- 0.41	0.47	
Marital status - married, spouse present omitted						
Widowed	-0.02	0.55		- 1.35	0.52	***
Divorced	-0.66	0.23	***	- 0.50	0.23	**
Separated	-0.98	0.62	*	- 1.62	0.59	***
Economic variables						
Earnings (\$10,000)	-0.01	0.01		- 0.02	0.01	***
Has health insurance coverage	1.50	0.44	***	2.04	0.44	***
Plan details						

²⁰ Insignificant variables were not listed. The complete list of included independent variables are: earnings, age, gender, race, citizenship, tenure, unemployment rate in state of residence, whether pension plan contributions depend on employee contributions, whether pension plan allows loans, whether pension plan allows investment choice, employer contribution, whether employee has a DB plan, firm size, number of children younger than 18 in household, whether household members receive transfer benefits, hours of work, whether worker has health insurance coverage, household net worth, marital status, and for married households, whether spouse participates in a DC plan, spouse's hours of work, spouse's DC plan contribution rate, whether spouse has a DB plan.

Plan allows loans	0.32	0.17	*	0.64	0.17	***
Plan allows investment choice	1.24	0.18	***	0.88	0.18	***
Work variables						
Large firm (100+ employees)	1.30	0.18	***	0.87	0.18	***
Hours of work	0.01	0.01	**	0.01	0.01	
Tenure	0.03	0.01	***	0.04	0.01	***
Household variables						
Household net worth (\$10,000)	0.02	0.00	***	0.03	0.00	***
Children under age 18 in household	-0.18	0.08	**	-0.09	0.08	
Household receives government benefits	-1.24	0.23	***	-1.07	0.23	***
Intercept	-1.18	0.84		-2.34	0.86	***
Observations	5382			5487		
R-squared	0.12			0.12		

*** Indicates the estimated b is significant at the 1.4% level or better, ** indicates significance at the 1.5-5% level, * indicates significance at the 5.5-10% level. Data source: 2008 SIPP panel wave 3, merged with wave 4 (contains household net worth information). Sample is limited to respondents age 21-68, who were working only one job in the private sector and had non-negative earnings.

Appendix 3b
 Baseline Regression: Significant Determinants of Employee's Contributions
 for 2009 and 2012, for Married respondents

Contribution rates (in percentage. 1%=1)	2009, Married			2012, Married		
Demographic variables						
Age	0.03	0.0 2	*	0.07	0.0 2	** *
Male	0.41	0.3 0	*	0.15	0.2 7	
Race - White omitted						
Black	-1.20	0.6 1	**	-1.02	0.5 4	*
Hispanic	-1.40	0.6 1	**	-0.55	0.5 5	
Economic variables						
Earnings (\$10,000)	-0.04	0.0 3		-0.02	0.0 1	**
Work variables						
Firm size - Large	1.10	0.3 3	** *	0.62	0.3 3	* *
Tenure	0.01	0.0 2		0.03	0.0 2	*
Hours of work	0.02	0.0 1	*	0.00	0.0 1	
Plan details						
Plan allows loans	0.17	0.3 1		0.53	0.3 1	*
Plan allows investment choice	1.07	0.3 4	** *	1.23	0.3 3	** *
Employer contribution rate	0.05	0.0 2	** *	-0.02	0.0 2	
Household variables						
Household receives government benefits	-0.56	0.4 8		-0.75	0.4 7	*
Household net worth (\$10,000)	0.02	0.0 0	** *	0.03	0.0 0	** *
Spousal variables						
Spouse hours of work	0.00	0.0 1		-0.02	0.0 1	**
Spouse contribution to a pension plan	0.29	0.0 2	** *	0.21	0.0 2	** *

Intercept	1.27	1.		-1.53	1.7 2	
Observations	1892			2061		
R-squared	0.17			0.16		

*** indicates the estimated b is significant at the 1.4% level or better, ** indicates significance at the 1.5-5% level, * indicates significance at the 5.5-10% level. Data source: 2008 SIPP panel wave 11, merged with wave 10 (contains household net worth information). Sample is limited to respondents age 24-71, who were working only one job in the private sector and had non-negative earnings.