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Do mandatory retirement contributions crowd out voluntary contributions?

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1. The important role of voluntary contributions in defined contribution plans

Households are increasingly responsible for making their own decisions about how much to save for their retirement. As Social Security benefits decline, and with most employer-sponsored defined benefit (DB) plans frozen or eliminated, defined contribution (DC) plans are the major retirement savings vehicle that individuals control (Friedberg and Owyang 2002). The value of assets in private sector DC plans increased from $74 billion in 1975 to over $5 trillion in 2013, with more than 50% of future retirees expecting to rely on a DC pension as their primary source of retirement income (Saad 2017).

DC plan design places considerable responsibility on individuals to ensure the adequacy of requirement income. While traditional DB pensions promise specific future benefits that employers are responsible for funding, a DC pension accumulates contributions in an account, leaving future retirement resources uncertain. A relatively high contribution rate is required for employees to be able to maintain their standard of living during retirement (Ellis, Munnell, and Eschtruth 2014), but plans differ in whether employee or employer contributions are mandated, leaving a critical role for voluntary contributions by most employees. Questions remain, however, about how the level or mix of required employer and employee contributions affect voluntary contributions. We study how employees respond to a shift in the level and mix required contribution rates at a large public university.

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Although the goal of required contributions may be to ensure adequate resources in retirement, especially for people with a low propensity to save, economic theory in fact predicts that required contributions will *crowd out* voluntary contributions for those who would have saved on their own. Evidence of crowd-out in response to DC pensions dates back decades, often based on aggregate saving data or comparisons across employers that did or did not offer a DC pension.[1] Using employer-level data to analyze changes in required contributions can shed more light on the magnitude of crowd-out.

We consider the theoretical and empirical effects of a shift in mandatory contributions using ten years of administrative data from faculty at a large public university. Starting in 2010, new employees experienced two changes relative to employees hired earlier: (1) the employer contribution rate fell from 10.4% to 8.9%, a 1.5 percentage point (pp) decline, and; (2) a new mandatory employee contribution of 5% was established. Consequently, the total mandatory contribution rate rose from 10.4% to 13.9%, a 3.5 pp increase. The policy changed following state legislation that increased contribution rates for all new state employees to alleviate chronic underfunding in the DB plan.

Standard economic theory predicts that voluntary contributions by employees should generally fall by between 3.5 and 5 pp, reflecting a strong *crowd-out effect* since they are interchangeable with the higher total required contributions. The predictions do not actually depend on the shift in the employer-employee split in contributions.

In fact, we find evidence of incomplete crowd-out by examining both the decision to participate in the voluntary plan and the amount contributed after the policy change.

- We estimate a small and often statistically insignificant reduction in the share who make any voluntary contributions to the DC plan.
  - We estimate that participation in the voluntary plan fell between 3-6 pp (depending on how many months passed since the date of hire) among those who choose the DC plan, with these estimates often not statistically significantly different from zero. Since the potential for crowd-out on the participation margin is about 50% (representing the share of employees who contributed more than zero and less than 5% in the pretreatment period), this reduction from the participation effect is modest.
- Among those who continue to make voluntary contributions, we estimate a reduction in voluntary contributions that falls short of predicted crowd-out.
  - We estimate that voluntary contributions fell by 2.25 pp, on average, among those who make any contributions. When compared to the 5% mandatory increase in employee contributions, this amounts to a "crowd-out rate" of 45%. This response falls short of the decline of up to 5.0 pp predicted by standard theory. The lower bounds of the 95% confidence intervals consistently reject the 5 pp reduction predicted by the crowd-out effect.

Overall, our results suggest a high prevalence of passive saving and highlight the importance of salience in an increasingly complicated choice environment. That may help explain why we find that an increase in mandatory employee contributions is effective at raising total retirement contributions.

[1] Early research on the growth of DC plans found conflicting evidence about crowd-out, with Engen et al (1994) finding evidence in favor and Poterba *et al.* (1995) finding evidence against crowd-out. More recently, using novel data and novel sources of variation, some researchers (for instance Gelber (2011); Chetty et al. (2014)) find that the increase in DC pension balance represents new savings while others (e.g., Benjamin (2003); Engelhardt & Kumar (2007)) find that the changes in 401(k) savings accounts are shifts from some other financial accounts.

2. A substantial change in required contribution rates

A large majority of faculty at the university initially select the university-run 401(a) DC plan with mandatory contributions over the state-run DB plan.[2] The total required contribution rate in this DC plan changed substantially for new employees hired after July 1, 2010. These changes are summarized in Table 1.

Table 1. Summary of policy change to contribution rates, percent of salary

	Hired Before July 1, 2010	Hired After July 1, 2010
Mandated employee contribution rate	0%	5%
Mandated employer contribution rate	10.4%	8.9%
Total contribution rate	10.4%	13.9%

Note: This table summarizes the changes in the university 401(a) DC plan based on the employee's date of hire. Employees faced a one-time irrevocable choice between a state DB plan and this DC plan.

For employees hired before the policy change, the university contributed 10.4% of their monthly pay to the mandatory DC plan, and employees were not required to contribute any money to the plan. A state law enacted in 2010 establishes a 5% employee contribution. In response, the university reduced its employer contribute rate to from 10.4 to 8.9% for employees hired after that date, resulting in a total contribution rate of 13.9%. The law was enacted along with DB benefit cuts to alleviate underfunding in the state DB plan. Importantly, this change in mandatory contribution rates was not an element of a broader set of changes in university policy that might have also affected retirement plan choices.

The larger context for the required contribution policy, which itself might not be that transparent, is a complicated set of retirement plan choices. Following the initial choice between the DB and DC plan, faculty who opt for the mandatory DC plan rather than the state DB plan make a second decision for their mandatory contributions, among two vendors and numerous funds for each vendor.[3] Third, faculty can choose voluntary contributions with a very limited match rate, of 50% for up to $40 per month. Fourth, faculty can choose additional voluntary contributions, which can be directed to a university-run 403(b) plan and a state-run 457 plan, or, near the end of our sample period, a university-run Roth 403(b) plan and a state-run Roth 457 plan.[4] Fifth, faculty must choose among two vendors for 403(b) contributions, while the 457 plan has a single (different) vendor, and among numerous funds for each vendor, with fund menus differing for the 401(a), 403(b), and 457 plans. The focus of our analysis is on the sum of voluntary contributions made in the third and fourth steps.

The policy change we consider generates strong crowd-out predictions under standard economic theory, which assumes a full understanding of the choice environment. Economic theory predicts that voluntary contributions by employees should fall by between 3.5 and 5 pp, ignoring momentarily employees with a low propensity to save. This reflects a *crowd-out effect*, which would lead to a full 5 pp reduction as voluntary contributions are replaced by the new employee contribution of 5%. The crowd-out effect is mitigated by a *compensation reduction* effect, however, because the reduction in the employer contribution without an accompanying pay increase (which we find no evidence of) represents a cut

[2] We will refer to the 401(a) plan as the mandatory DC plan, though it is only mandatory after the DB-DC choice, because this helps distinguish it from the voluntary DC plans that are our main focus.

[3] They can split contributions among the two vendors and among all the funds offered by each vendor.

[4] The 403(b) and Roth 403(b) options are jointly subject to IRS contribution limits, just like 401(k) plans are. The 457 and Roth 457 options are jointly subject to *additional* IRS contribution limits, meaning that faculty are able to contribute twice as much to retirement plans as most other employees are.

in total compensation of 1.5 pp. While this compensation effect should range between 0-1.5 pp, we anticipate that it would be small, if the 1.5 pp reduction is scaled by the average voluntary contribution rate in our sample of 6%-8%. An additional *participation effect* should arise among employees who would contribute small amounts in the absence of required contributions and are not able to respond by reducing voluntary contributions by the full crowd-out amount; this crowd-out effect instead shrinks the overall reduction in voluntary contributions to less than 3.5-5 pp, while causing a reduction in the propensity to make any voluntary contributions at all that otherwise would not be observed.

The standard theory, however, relies on the implicit assumption that employees are fully aware of all aspects of their retirement plan. If this is not the case, different conjectures about what may be salient to employees leads to different predictions. One possibility is that some employees are only aware of required employee contributions, which are deducted from their regular paycheck, but not employer contributions, which might only be observed on the quarterly statements they receive from retirement plan vendors—if so, then a full 5 pp crowd-out response may be more likely. Anther more extreme possibility is that some employees are unaware of any required contributions at all, in which case they would not respond to the change in the level and mix of contributions that we study.

3. How did faculty react?

Because both required and voluntary contributions play an important role in retirement wealth accumulation, we seek to understand how faculty responded to the new 5% required employee contribution, together with the smaller 1.5 pp decline in the required employer contribution. Did the new policy lead to substantial crowd out of faculty's own voluntary DC plan contributions, as standard economic theory predicts? Do faculty appear to be aware of the changes in required contributions?

To answer these questions, we construct a novel data set using the university's administrative records. We compare new hires who come on board in the five years before versus after the change in contribution rates that took place in 2010. We observe 2,867 new faculty hires during those ten years, and, after the initial choice of the university DC plan with mandatory contributions over the state DB plan, we analyze their participation in voluntary DC plans in the first twenty-seven full-time months after being hired; and their voluntary contribution rates as a percent of salary in those first twenty-seven months.[5] We undertake regression analysis to control for observable demographic and job characteristics as well as stock market returns, all of which are likely to affect contribution rates.[6]

Our key findings are as follows:

1. Choice of whether to make any voluntary contributions to the university DC plan. Among faculty who chose the university DC plan with required contributions, we are interested in crowd-out of voluntary contributions. Figure 1 demonstrates whether faculty changed their voluntary participation rate, comparing new faculty over a twenty-seven month window after hire, before and after July 1, 2010.[7]

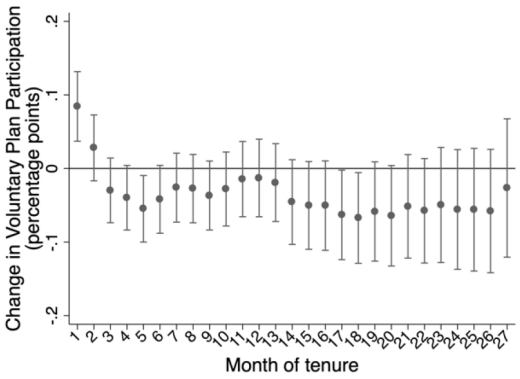
[5] The twenty-seven month window represents three years of calendar time, omitting summer months when many faculty do not receive salary. It is important to consider a window of time after hire, given the finding in Madrian and Shea (2001) that retirement plan participation rates generally increase in the early years of employment, as employees overcome inertia and make retirement plan choices.

[6] We further demonstrate that none of the observable demographic or job characteristics changed in a statistically significant or economically meaningful way when comparing new hires before versus after 2010. This reduces concerns that the change in required contribution policy altered the set of faculty who accepted jobs at the university. In addition, we examine whether a change occurred in the one-time irrevocable choice of the university DC plan versus the state DB plan, which experienced a cut in future benefits at the same time that the required contribution rates in the DC plan changed. We find a moderate 3.7 percentage point increase in participation in the DB plan, perhaps because the change in required contributions for the DC plan was more salient than the future benefits cuts in the DB plan.

[7] Figures 1-3 plot Ordinary Least Squares estimates of the interaction between indicators for tenure month and an indicator for being hired after July 2010 from the event study regressions corresponding to equation (3). Whiskers denote 95% confidence intervals with standard errors clustered by employee. Additional control variables include the monthly S&P 500 index, and indicators for tenure month, female, full-time employee, married, single, and income and age bands. Voluntary DC participation consists of contributions to either the 403(b) plan or the 457 plan, or, beginning in 2013, Roth options of each. The voluntary DC contribution rate is defined similarly, with Roth contributions adjusted for their post-tax status, and is reported relative to annual salary.

New faculty hired after the policy change are less likely to make any voluntary DC contributions. The difference ranges between 3-6 pp, with the larger differences emerging later in the window. Most of the estimates are not statistically significant, or only marginally so. We can gauge the magnitude of our estimates by the potential for crowd-out on the participation margin, with about 50% of participants contributing more than zero and less than 5% in the pretreatment period. Compared to that, a reduction of 3-6 percentage points suggests a modest participation effect.

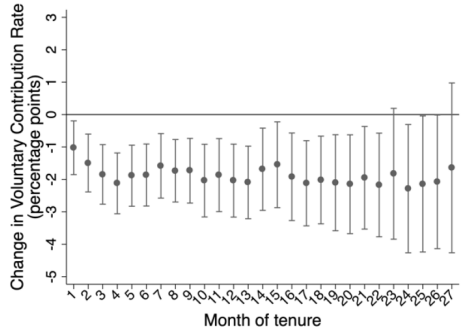
Figure 1. Voluntary participation rate among new hires, by tenure month



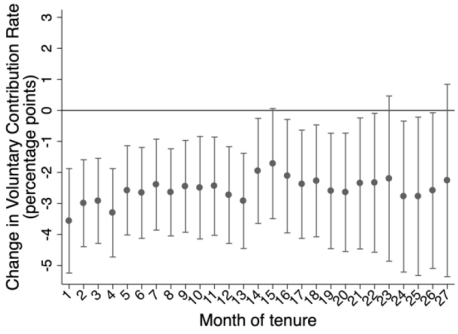
2. How much faculty contribute to the university voluntary DC plans. Our other outcome of interest is the magnitude of voluntary contributions, among faculty who choose to contribute more than the required amount to their DC plan. Figure 2 displays the average voluntary contribution rate, as a share of salary, for (a) faculty who make positive contributions and (b) all faculty. The figures once again compare new faculty over a twenty-seven month window after hire, before and after July 1, 2010.

Figure 2. Average voluntary contribution rate (% of salary) among new hires, by tenure month

(a) Voluntary contribution rate, if positive



(b) Voluntary contribution rate, all faculty



We find more evidence of a response for the amount contributed, both conditional on participating in at least one voluntary plan and overall. Conditional on a positive contribution, new faculty hired after the policy change reduce their average voluntary contribution rate by 2.25-2.5 pp, a statistically significant reduction. Including those with zero contributions, the average reduction is generally between 1.5-2 pp. Both responses are fairly stable after the first few months.

Our incomplete crowd-out results suggest a lack of salience of required contributions. The crowd-out and compensation effects should lead to a 3.5-5 pp reduction, and likely closer to 5 pp, yet the lower bounds of the 95% confidence intervals consistently reject a 5 pp reduction in contribution. Overall, we estimate a "crowd-out rate" of about 45%.

4. Discussion

Our findings of incomplete crowd-out reject the predictions of standard theory. We detect reductions of voluntary contribution rates of around 2.25 pp, on average, which represents 45% crowd-out in response to the 5 pp increase in mandatory employee contributions. Our 95% confidence intervals statistically reject the 5 pp reductions predicted by theory. We estimate small, and often imprecise, declines in participation of around 3-6 pp, so the participation margin is responding weakly as well to the policy. This suggests a high prevalence of passive saving and highlight the importance of salience.

The lack of salience of mandatory contributions accords with results in other retirement planning settings (Chetty et al. 2014). In fact, we find a lower crowd-out rate from required contributions than Card and Ransom (2011) did using data from 20-30 years ago in a cross-university setting. This may be because the choice environment has grown increasingly complicated since then, including at the university we study, with the addition of further DC options (like Roth plans and catch-up contributions), the proliferation of fund offerings (until a recent move by many university employers to simplify fund lineups), and the increasing prevalence of accounts offered to manage not just retirement saving but also health insurance costs (through Flexible Spending Accounts and now Health Savings Accounts, which have features that resemble retirement accounts (Leive 2019)). In future work, we intend to consider how disparate groups of employees may be distinguished, based on their observed retirement plan choices, even before any retirement plan changes are instituted. This may help employers target policy changes and design communication strategies to help employees who differ in their attentiveness and responsiveness reach their retirement planning goals.

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