The Effect of Employer Matching and Defaults on Workers' TSP Savings Behavior

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The Literature and Our Contributions

Most studies of defined contribution pension plans indicate that the default contribution rate has a much larger effect on employees' behavior than financial incentives do.

Current empirical approaches are ill-suited for forecasting the effect of changes in matching or default rates because few studies develop models that predict the distribution of employees' contribution rates.

We have developed an empirical model that forecasts how changes in matching and default rates would affect the distribution of employees' contribution rates.

A specification motivated by psychological anchoring fits the data and indicates that most of the estimates from the literature substantially understate the effect of matching.

Data on Federal Employees

We use administrative data on almost all civilian federal employees that span the period from 2008 through 2014, including the following:[1]

- The amount that the employees contribute, their balance in each asset, default contribution rates, eligibility for matching contributions, and other information on their activity with the Thrift Savings Plan (TSP); and

- Extensive information on the employees' characteristics and compensation, including the day they were hired and detailed information about their scheduled salaries.

Changes to Federal Employees' Retirement Benefits

The data cover two substantial changes in policy.

■ An overhaul of retirement benefits:

- Workers hired before 1984 are generally in the Civil Service Retirement System (CSRS), which provides a defined benefit (DB) pension but no employer contributions to TSP.

- Workers hired in later years are in the Federal Employees Retirement System (FERS), which incorporates Social Security and provides a DB pension and matching contribution to TSP (a 100 percent match on the first 3 percent that the employees contribute and a 50 percent match on the next 2 percent).

■ The implementation of automatic enrollment (AE) with a default contribution rate of 3 percent for workers hired after August 2010. (The default allocation for contributions is the G Fund. The interest rate for that fund is based on the yield for Treasury notes.)

Behavior and Traits of Adjacent Cohorts With Different Matching Contributions

	No Match *(Hired in 1983)*	Match *(Hired in 1984)*
TSP Behavior		
Percentage of workers who contribute	69.5	91.7
Average contribution rate (As a percentage of salary)	5.9	9.2
Average contribution rate for those who contributed (As a percentage of salary)	8.5	10.0
Percentage of workers whose whole portfolio is invested in the G Fund	16.7	24.1
Pecentage of workers' portfolio invested in the G Fund	45.5	53.1
Average ratio of balance to pay	0.8	2.5
Sample Size	90,566	133,052

Behavior and Traits of Adjacent Cohorts With Different Matching Contributions (Continued)

	No Match *(Hired in 1983)*	Match *(Hired in 1984)*
Demographics		
Average age	55.5	54.6
Female (%)	43.7	47.8
White (%)	76.8	73.6
Black (%)	16.7	19.6
Hispanic (%)	6.5	6.8
High school or less (%)	26.4	27.0
Some college (%)	24.7	24.3
College (%)	32.4	31.8
Graduate school (%)	16.5	16.9
Average annual earnings (2014 $)	97,085	94,572
Sample Size	90,566	133,052

Behavior and Traits of Adjacent Cohorts With Different Default Contribution Rates

	Hired Before AE *(Hired between August 2009 and July 2010)*	Hired After AE *(Hired between August 2010 and July 2011)*
TSP Behavior		
Percentage of workers who contribute	80.6	97.4
Average contribution rate (As a percentage of salary)	5.3	5.6
Average contribution rate for those who contributed (As a percentage of salary)	6.6	5.8
Percentage of workers whose whole portfolio is invested in the G Fund	56.8	63.0
Pecentage of workers' portfolio invested in the G Fund	66.3	71.5
Average ratio of balance to pay	0.4	0.4
Sample Size	572,783	438,295

Behavior and Traits of Adjacent Cohorts With Different Default Contribution Rates (Continued)

	Hired Before AE (Hired between August 2009 and July 2010)	Hired After AE (Hired between August 2010 and July 2011)
Demographics		
Average age	42.0	41.6
Female (%)	41.28	41.25
White (%)	76.33	76.11
Black (%)	17.54	18.22
Hispanic (%)	6.13	5.67
High school or less (%)	26.61	28.34
Some college (%)	16.10	17.36
College (%)	30.43	27.47
Graduate school (%)	26.87	26.83
Average annual earnings (2014 $)	66,826	61,058
Sample Size	572,783	438,295

Treatment Effects Model: Results for Employer Matching

- Participation increases by 22 percentage points.

- The conditional contribution rate increases by 1.9 percentage points.

- The average contribution rate increases by 3.5 percentage points.

- The balance-to-pay ratio is twice as large 28 years later.

- There is a negligible effect on portfolio allocations.

Treatment Effects Model: Automatic Enrollment

- Participation increases by 19 percentage points.

- The conditional contribution rate decreases by 0.4 percentage points.

- The average contribution rate increases by 0.6 percentage points.

- Overall, 19 percent more workers hired after AE are at the default rate of 3 percent and fully invested in the default fund than those hired before AE.

- More likely to be at the default are women, workers hired in their 40s and 50s, those in the bottom tercile of earnings, nonwhites, and those with less education.

# Discrete Choice Model for the Distribution of Employees' Contribution Rates

We use a hazard model to describe the behavior of most workers:

$$\text{Pr}\left(k_{i,t} = k_{i,t}^{obs} \mid k_{i,t} \leq k_{i,t}^{obs}, k_{i,t} < k_{i,t}^{max}\right)$$
$$= \text{Pr}\left(\tau_k + matching\ effects_{i,t,k} + default\ effects_{i,t,k} + X_{i,t,k}\gamma_{i,t,k} > \varepsilon \mid k_{i,t} \leq k_{i,t}^{obs}, k_{i,t} < k_{i,t}^{max}\right)$$

We consider two specifications of *matching effects* and *default effects.* They are motivated by different models of workers' behavior:

▪ Conventional models of intertemporal utility maximization and

▪ Models of psychological anchoring and inattentiveness

Distribution of Employees' Contribution Rates, by Eligibility for Employer Match
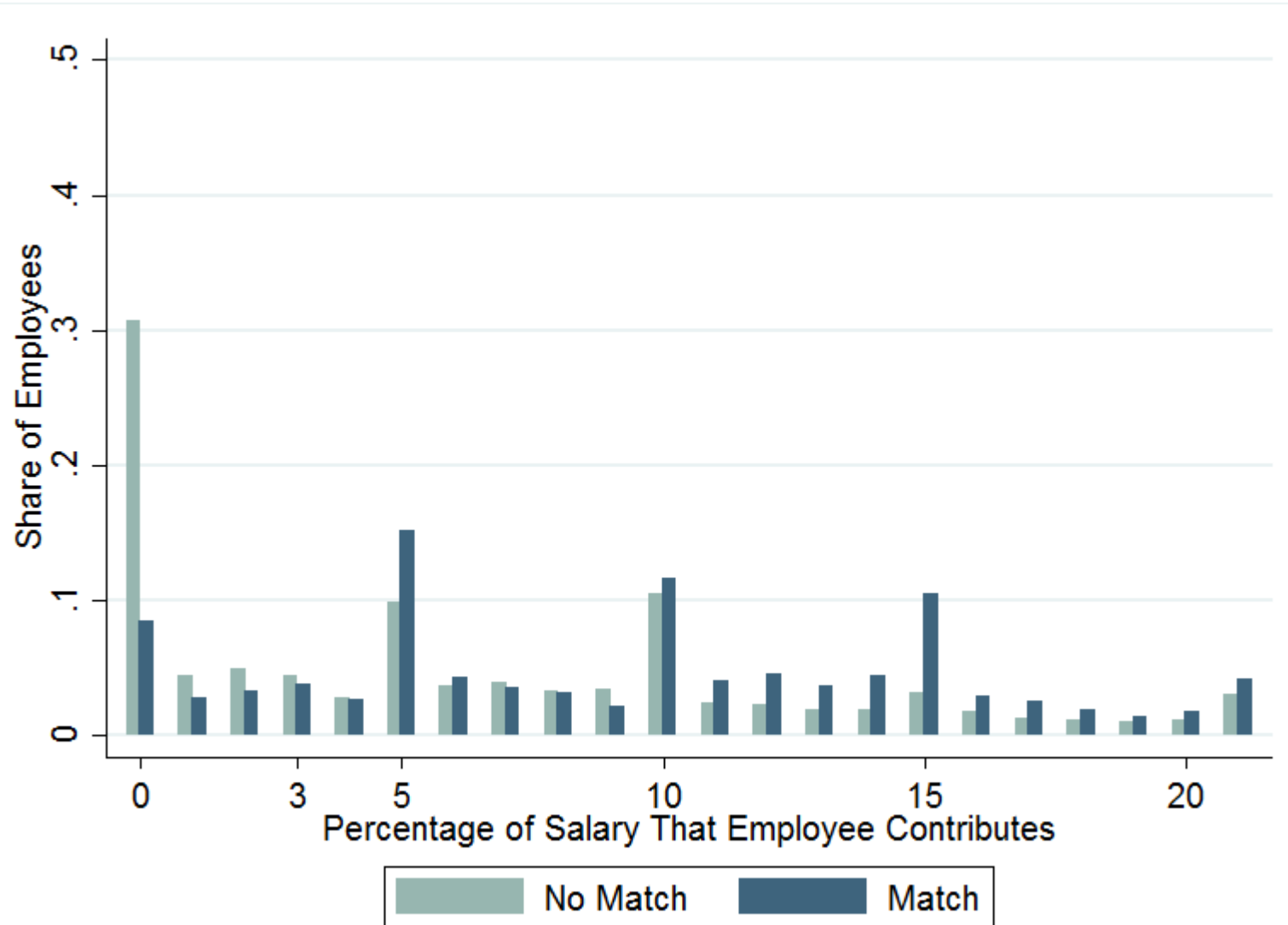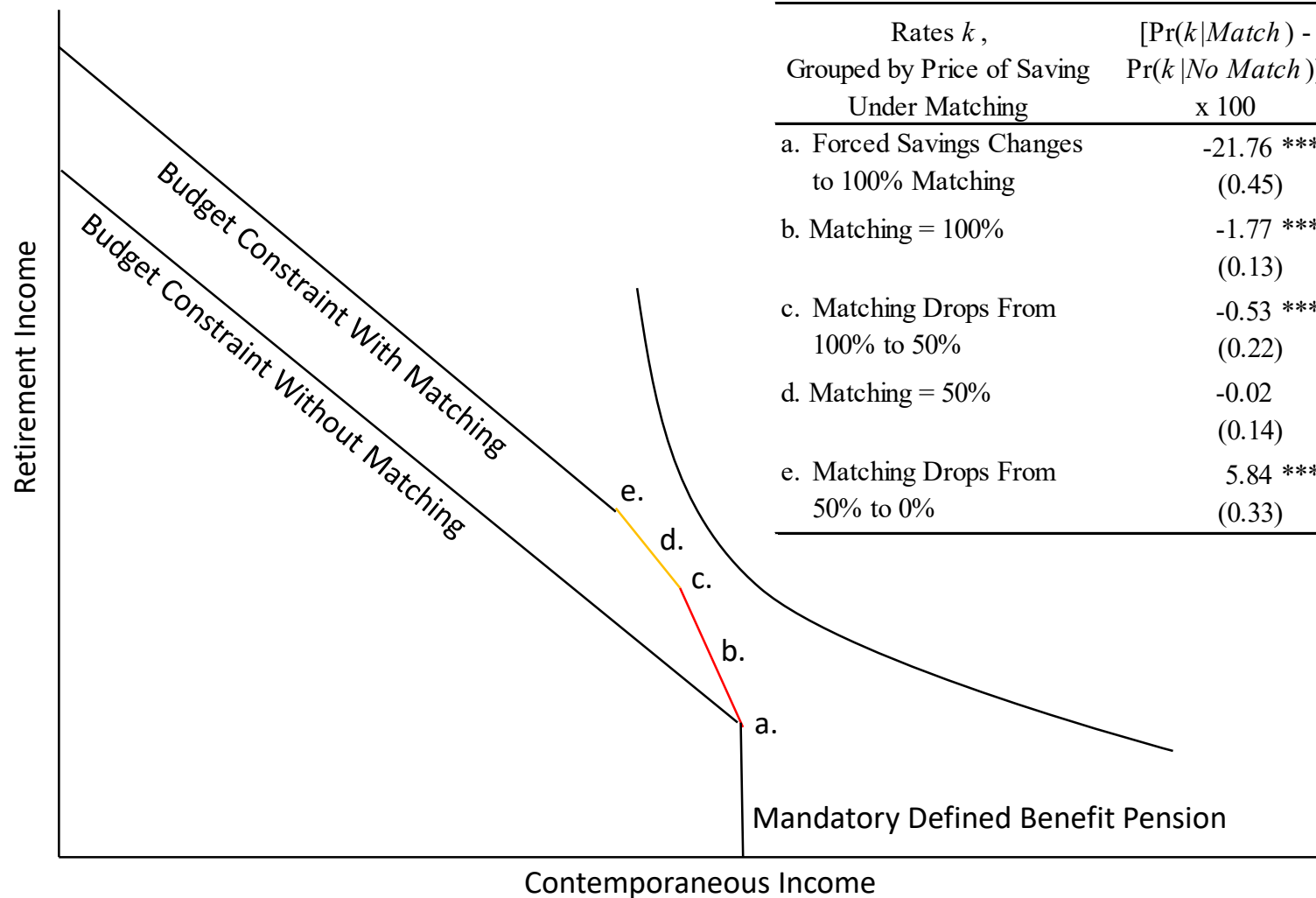
Intertemporal Substitution

All four tests that we run indicate that intertemporal substitution is not prevalent.

- The shift from CSRS to FERS increases DB pension wealth for most workers, but workers in FERS choose to contribute more to the TSP.

- The DB pensions provided through FERS are more progressive, but lower-income workers in FERS contribute nearly double the amount that lower-income workers in CSRS do.

- An increase in the amount that employees must contribute to their defined benefit pensions had little effect on TSP contributions.

- The reduction in payroll taxes had little effect on TSP contributions.

The Relationship Between Employees' Contributions and the Price of Savings

Rates k, Grouped by Price of Saving Under Matching	$[\text{Pr}(k|Match)$ - $\text{Pr}(k|No\ Match)]$ x 100
a. Forced Savings Changes to 100% Matching	-21.76 *** (0.45)
b. Matching = 100%	-1.77 *** (0.13)
c. Matching Drops From 100% to 50%	-0.53 *** (0.22)
d. Matching = 50%	-0.02 (0.14)
e. Matching Drops From 50% to 0%	5.84 *** (0.33)

Significance levels: * = 10%, ** = 5%, *** = 1%.

Fit of Anchoring Specification for the Effect of Matching on the Distribution of Employees' Contribution Rates
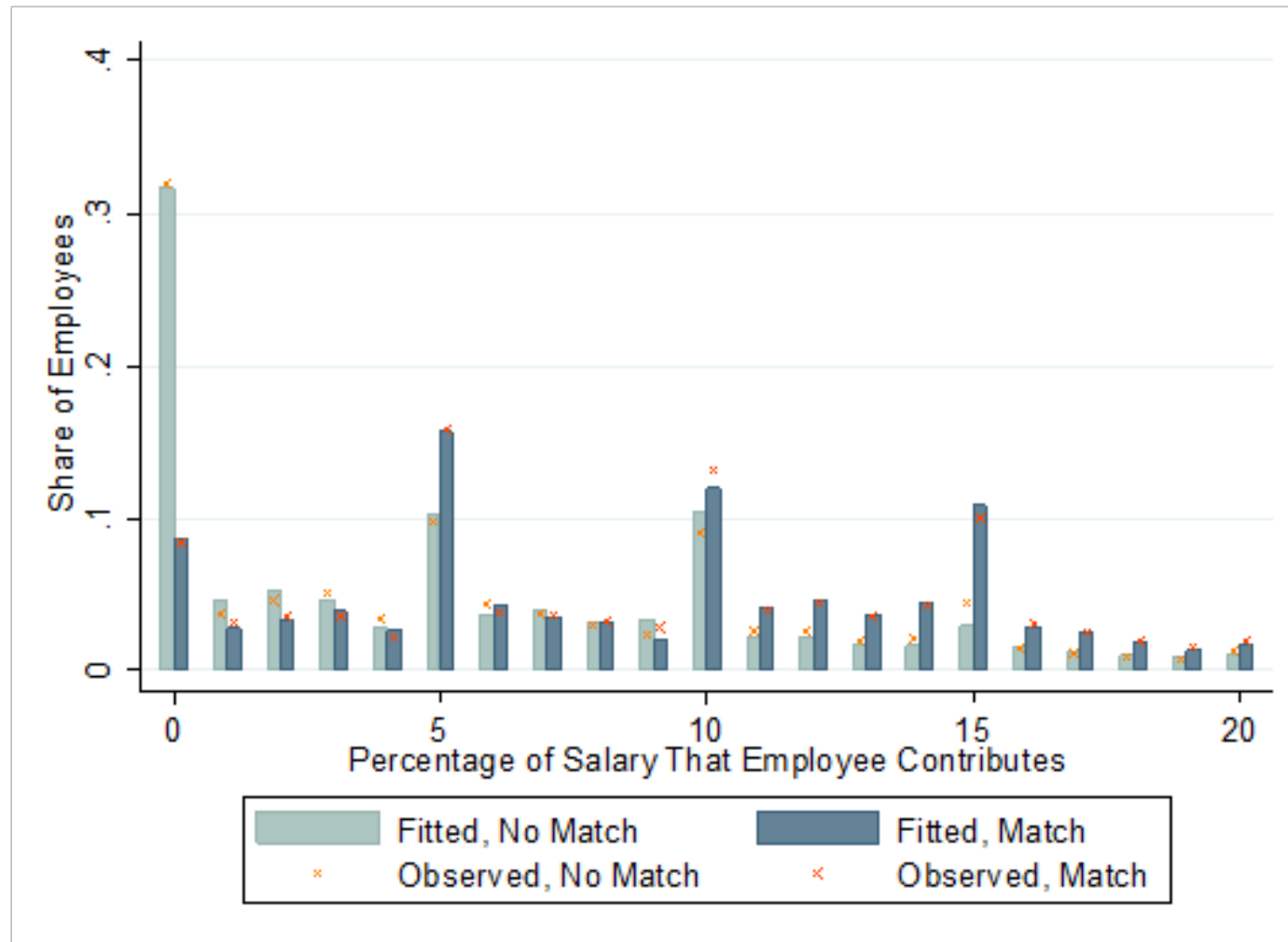
Average Effects of Adding Matching Contributions, by Specification

Change in Percentage Points

	Observed Difference Between Cohorts	Model Predictions	
		Utility Maximization	Anchoring
Employees' Contributions	3.29 ***	0.28 ***	3.26 ***
	(0.03)	(0.01)	(0.05)
Matching Contributions	3.43 ***	0.22 ***	3.45 ***
	(0.00)	(0.01)	(0.01)

Significance levels: * = 10%, ** = 5%, *** = 1%.

Distributions of Employees' Contribution Rates, by Default Contribution Rate
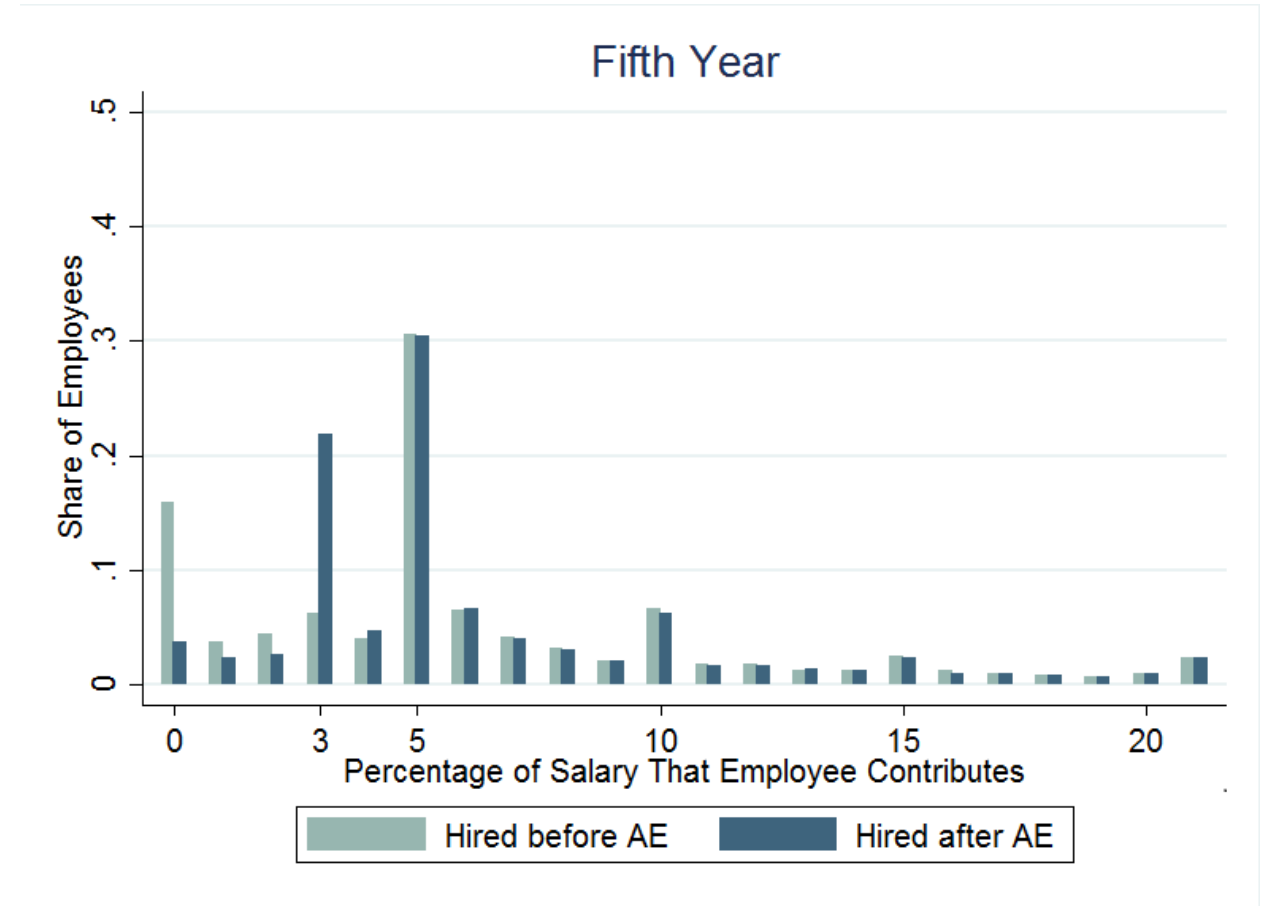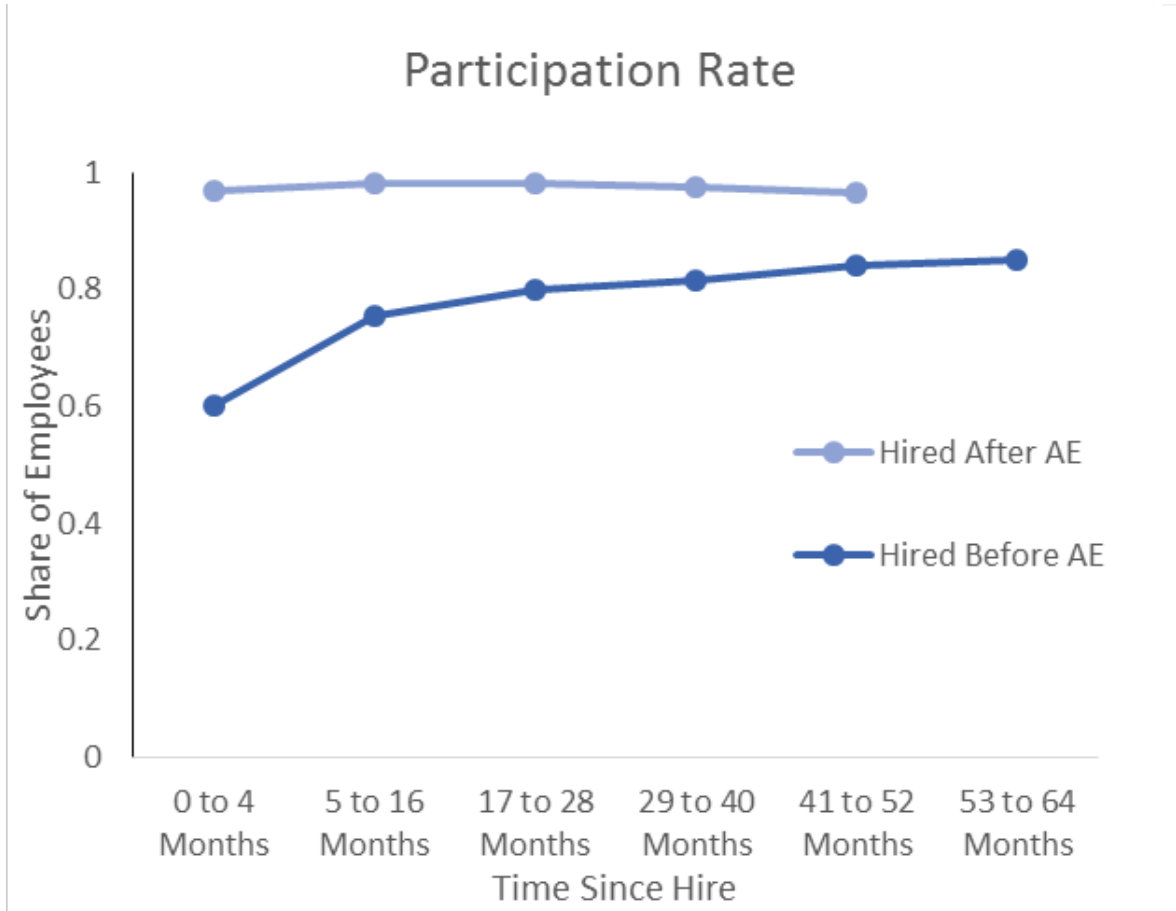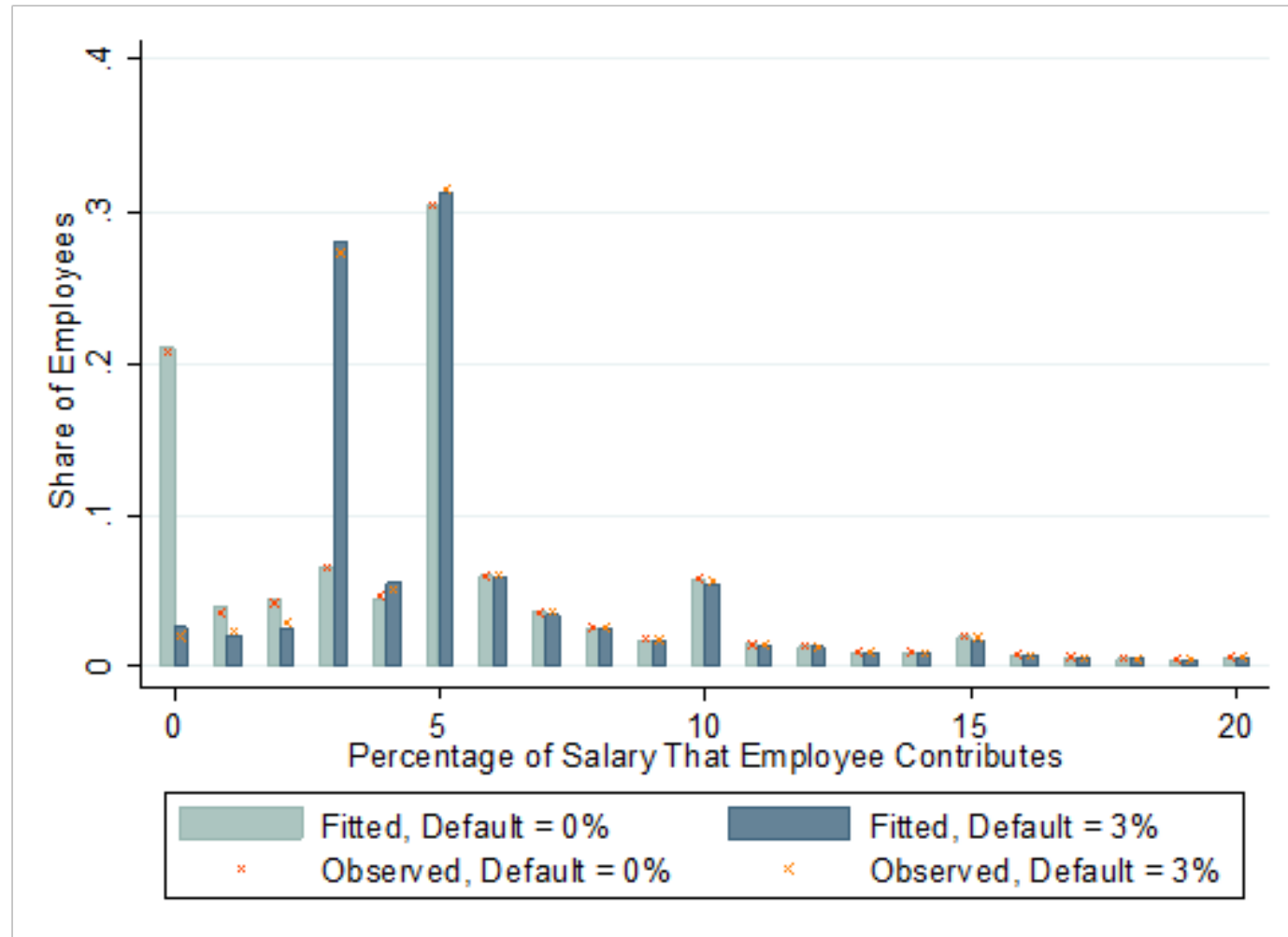
The Default Contribution Rate and Utility Maximization

We examine whether the mass points at the default contribution rates are consistent with utility maximization by calculating the transaction cost necessary to create such a mass.

Both measures that we consider indicate that the transaction costs necessary to reconcile the mass at the default rate with a model of utility maximization are implausibly large.

- In a rudimentary model, the cost of not electing a rate when the default rate is zero is about $2,600 in forgone matching, on average.

- The lack of a mass at the rate at which matching falls from 100 percent to 50 percent indicates that the benefits of contributing are large; thus the cost must be large as well.

Fit of Anchoring Specification for the Effect of the Default Rate on the Distribution of Employees' Contribution Rates
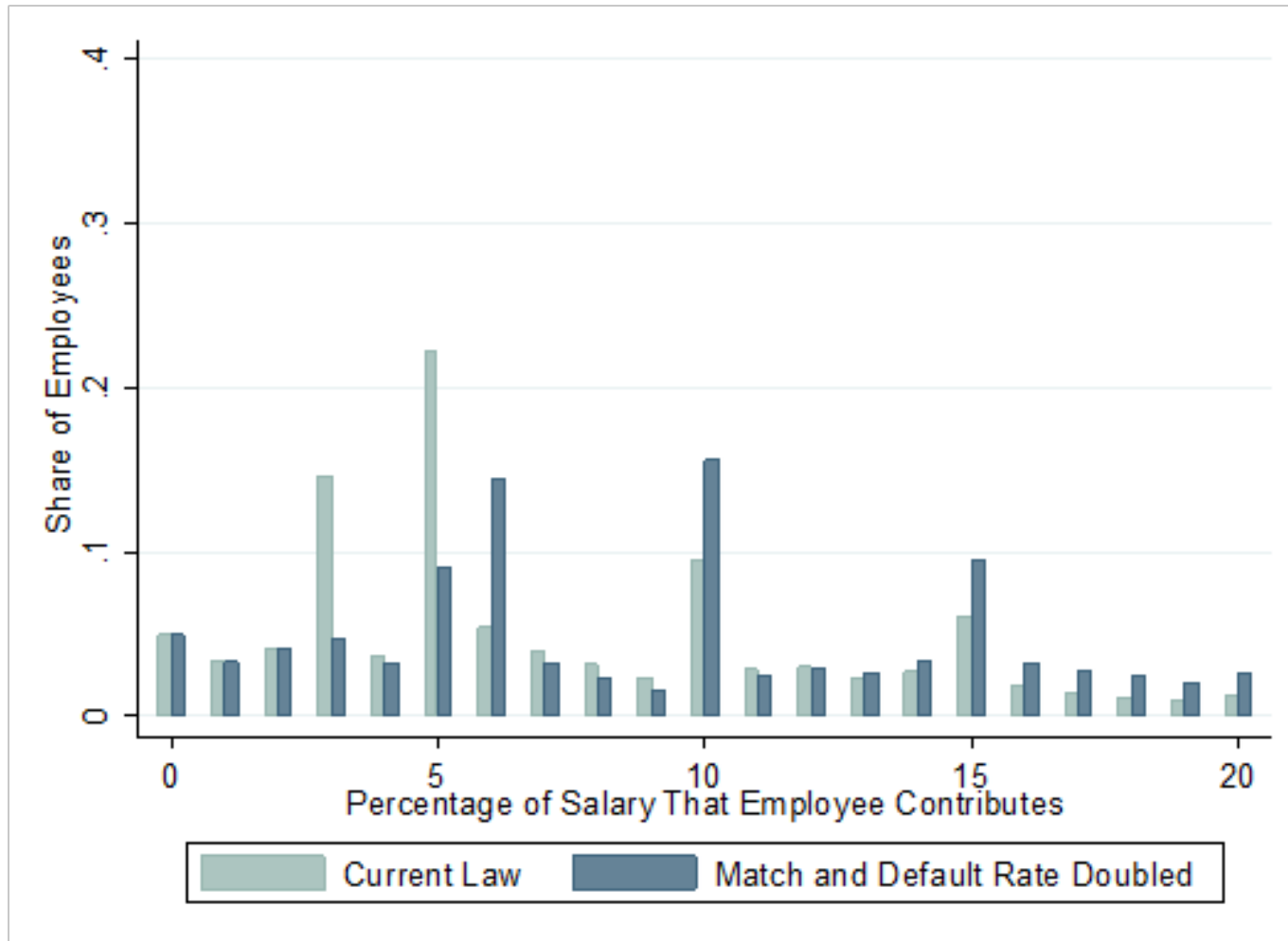
Average Effects of Increasing the Default Contribution Rate, by Sample

Change in Percentage Points

	Workers Hired Within a Year of the Increase	All Workers Hired After 1983
Employees' Contributions	0.54	0.30
Matching Contributions	0.60	0.31

Simulated Distributions of Employees' Contribution Rates, by Match and Default Contribution Rate

We use the model to forecast the effects of policies that would replace the FERS DB pension with additional contributions from employers and higher default rates.

Specifically, matching increases from 100 percent on the first 3 percent that employees contribute and 50 percent on the next 2 percent to 100 percent on the first 6 percent and 50 percent on the next 4 percent. The default rate for employees' contributions is increased from 3 percent to 6 percent.

Simulated Average Effects of Simultaneously Doubling Matching and the Default Contribution Rate

Change in Percentage Points

	Effect of Matching	Effect of Default Rate	Total Effect (Includes Interactions)
Employees' Contributions	1.39	0.40	1.80
Matching Contributions	2.33	0.10	2.67