

The Evolution of 401(k) Balances Under Automatic Enrollment

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Abstract: Automatic enrollment in a 401(k) plan can lead many employees to have higher plan contribution rates. However, many households who have defined contribution plan balances withdraw funds prior to reaching retirement age. It is an open question whether households' pre-retirement withdrawal decisions months or years after they have experienced automatic enrollment offset any increase in plan balances induced by automatic enrollment. We explore this issue by studying a 401(k) plan that introduced automatic enrollment in 2005. Comparing employees hired in the year after the introduction to employees hired in the prior year, we find that pre-retirement withdrawals only partially offset the impact of automatic enrollment. Cumulative withdrawals five years after hire are higher under automatic enrollment by more than one percentage point of starting salary, but plan balances are nonetheless higher by six percentage points of starting salary.

Keywords: savings, defined contribution plan, 401(k), plan design, default, automatic enrollment, withdrawals, loans, leakage, accumulation

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Previous research has documented that automatic enrollment in employer-sponsored defined contribution retirement plans has a powerful impact on savings outcomes. When a plan's default—the option that is implemented on behalf of an employee if that employee does not actively elect an alternative option—is changed from not participating in the plan to contributing a positive fraction of pay to the plan, the proportion of employees contributing to the plan increases dramatically, and many employees who would have otherwise refrained from participating begin to accumulate plan balances (Madrian and Shea, 2001; Choi et al., 2002 and 2004; Beshears et al., 2008). For example, when a chemicals company introduced automatic enrollment at a 3% default contribution rate, the fraction of employees participating in the 401(k) plan 24 months after hire increased by 25 percentage points, from approximately 70% to approximately 95% (Beshears et al., 2008). Many employees continue to save at the default contribution rate for years. At the chemicals company, 28% of employees who had been automatically enrolled upon hire remained at the 3% default contribution rate at 15-24 months of tenure. Only 24% of employees in that group contributed 6% of pay, the minimum contribution required to earn all employer matching contributions. When the company later changed the default contribution rate to 6%, a mere 4% of employees hired under the new system contributed 3% of pay at 15-24 months of tenure, while 49% of employees in that group remained at the 6% default contribution rate (Beshears et al., 2008). Because defaults are so influential, employees who would have chosen modest contribution rates in the absence of automatic enrollment may save less in the plan if they are automatically enrolled at a low default contribution rate, but for many employees, automatic enrollment leads to higher 401(k) contributions (Choi et al., 2004).

Even though automatic enrollment increases plan contributions for many employees, the ultimate impact on the accumulation of plan balances is unclear. Argento, Bryant, and Sabelhaus (2015) have documented that many households make substantial withdrawals from their defined contribution accounts before reaching retirement age, a phenomenon known as “leakage” (because balances are “leaking” out of accounts). Among households under the age of 55 in aggregate, every dollar contributed to a 401(k) plan or similar tax-advantaged retirement account in a given year is accompanied by approximately \$0.40 of taxable withdrawals from retirement accounts. Any positive effect of automatic enrollment on plan contributions may be offset by subsequent pre-retirement withdrawals, leaving a reduced net impact (or no net impact) of automatic enrollment on plan balances.

We study the extent to which automatic enrollment increases 401(k) plan withdrawals and the implications for the evolution of 401(k) balances by examining the experience of Company A, a Fortune 500 company in the financial services sector that introduced automatic enrollment at a 2% default contribution rate for all employees hired on or after July 1, 2005. Our empirical strategy compares employees hired in the 12 months after the introduction of automatic enrollment to employees hired in the 12 months prior, focusing on employees who remained at the firm for at least one year and following the two cohorts over the course of the five years after they joined the firm. These two cohorts have similar demographic characteristics, but consistent with previous research, automatic enrollment (AE) leads the post-AE cohort to have markedly higher plan participation rates than the pre-AE cohort. Even though the default contribution rate is low, the post-AE cohort has higher average plan contribution rates as well. At five years of tenure, average plan balances as a fraction of starting salary are ten percentage points higher under automatic enrollment among employees who remain at the firm. Only 40% of members in each cohort are still employed by the firm five years after hire, but even without conditioning on continued employment, the post-AE cohort has plan balances that are higher than the plan balances of the pre-AE cohort by six percentage points of starting salary. If we augment plan balances by adding in withdrawals from the plan that were directly rolled over to another 401(k) plan or an IRA, the differences between the two cohorts are largely unchanged. Furthermore, the results are qualitatively similar for all four quartiles of the company's income distribution. Thus, while automatic enrollment increases 401(k) withdrawals and 401(k) loans, these factors only modestly offset the increase in contributions, resulting in a net positive effect on balances.

The paper proceeds as follows. Section I outlines the features of the Company A 401(k) plan and describes the data used in the analysis. Section II presents the main results, and Section III concludes.

I. Savings Plan and Data for Company A

Table 1 summarizes the features of the 401(k) plan at Company A. The company introduced automatic enrollment in the plan for all employees hired on or after July 1, 2005. Before that change, eligible employees could opt into the plan and make contributions. After the

change, all newly hired employees, following a five-day opt-out period, were automatically enrolled in the plan at a default contribution rate of 2% to a pre-tax account.

Company A also changed the eligibility criteria for the 401(k) plan on July 1, 2005. Prior to that date, employees had to be scheduled to work at least 20 hours per week and had to accrue three months of continuous service in order to participate in the plan. After that date, all employees were eligible to participate upon hire, with the change applying to both new and existing employees. Thus, our comparison of the pre-AE and post-AE cohorts measures not only the effect of automatic enrollment but also the effect of the change in eligibility requirements. However, the latter effect is small, as average contribution rates in the first year of tenure are 2%-3%, suggesting that the effect of a three-month delay in eligibility is approximately 0.5%-0.7% of starting salary.

While no other plan design changes occurred at the same time that automatic enrollment was introduced, the time period that we study featured some other adjustments to the plan parameters. ~~Company A implemented a contribution escalation option on August 1, 2005. Through this program, employees could elect in advance to have contribution rate increases take effect on January 1 each year.~~ Before January 1, 2006, employees could contribute up to 50% of pre-tax compensation to their 401(k) accounts, subject to IRS limits. After January 1, 2006, employees could contribute up to 75% of pre-tax compensation. In both periods, employees ages 50 and older whose elected contributions surpassed the IRS limits could make catch-up contributions, subject to IRS catch-up contribution limits. Company A implemented a contribution escalation option on August 1, 2006. Through this program, employees could elect in advance to have contribution rate increases take effect on January 1 each year.

Employees who attained at least one full year of tenure and logged at least 1,000 hours of work were eligible to receive employer matching contributions at a rate of 100% up to 4% of pay. These matching contributions were invested in Company A stock, and the default option was to have dividends reinvested in Company A stock. The matching contributions vested immediately.

Balances accumulated in the plan could be tapped through loans or diminished by withdrawals over time. Participants could take a maximum of two loans against their 401(k) balances at a time. A loan could be no less than \$1,000 and no greater than the minimum of 50% of a participant's account balance and \$50,000 minus the participant's highest outstanding loan

balance. Primary residence loans could have a maturity of up to 180 months, while all other loan type maturities were capped at 60 months. The loan interest rate was fixed over the duration of the loan at 1% above the prime interest rate as reported in the *Wall Street Journal* on the first business day of the month in which the loan application was made.

When an employee separated from the company, account balances less than \$1,000 were distributed to participants as cash withdrawals unless a participant opted to roll over the balance into an IRA or another 401(k) plan. The participant had the option to keep the account with the company's 401(k) plan following separation only if the balance was greater than \$5,000. In that case, the default was to keep the account with the company's 401(k) plan, but the participant also had the ability to receive a cash distribution or to roll over the balance into another retirement account. If the account balance was greater than \$1,000 but less than \$5,000, the default option following separation was for the balance to be rolled into an IRA, but the participant could also elect a cash distribution.

Participants could withdraw any balances for any reason while actively employed if they were older than age 59½. Actively employed participants younger than age 59½ could withdraw balances for any reason from after-tax accounts and certain rollover accounts. After exhausting all after-tax, rollover, and non-hardship funds in addition to all available loans, participants younger than age 59½ could qualify for hardship withdrawals for certain payments related to a primary residence, post-secondary education expenses, outstanding medical expenses, or funeral expenses. A withdrawal could be no less than \$500 and no greater than the sum of the stated hardship need and withholding taxes upon withdrawal.

Our employee-level data come from a large U.S. benefits administration firm. We have a series of year-end cross sections containing demographic and employment-related information such as birth date, hire date, gender, and compensation as well as 401(k) information such as initial plan eligibility date, current participation status, initial plan participation date, total balances, and asset allocation. We also have monthly contribution rate history, monthly loan status, and detailed contribution and distribution information.

We study employee 401(k) outcomes over the five years following hire. The pre-automatic enrollment (pre-AE) cohort consists of employees hired in the year preceding the introduction of automatic enrollment—that is, from July 1, 2004, to June 30, 2005. The post-automatic enrollment (post-AE) cohort consists of employees hired in the year following the

introduction of automatic enrollment—that is, from July 1, 2005, to June 30, 2006. Because our cross-sectional data are recorded as of the beginning of each calendar year, we compare the pre-AE cohort observed as of January 1, 2006, to the post-AE cohort observed as of January 1, 2007. We label this comparison the difference between the cohorts at one year of tenure, but it of course captures employees observed at 6-18 months of tenure. Our comparisons follow the same convention for subsequent years of tenure. The comparison of the cohorts at five years of tenure is measured as the difference between the pre-AE cohort observed as of January 1, 2010, and the post-AE cohort observed as of January 1, 2011. Figure 1 shows the distribution of hire dates for the pre-AE and post-AE cohorts. With the possible exception of a surge in hiring in May and June of 2006, the two cohorts are similar in their distributions of hire dates over the July-June window, so the timing convention for measuring 401(k) outcomes is unlikely to distort the comparison between the two cohorts. The major concern with a cohort-style analysis is that the cohort effects, which we ascribe primarily to the impact of automatic enrollment, may be confounded by calendar time effects. The concern is particularly acute at three years of tenure, as the pre-AE cohort is observed as of January 1, 2008, immediately prior to a year during which stock prices dropped precipitously, while the post-AE cohort is observed as of January 1, 2009, immediately after the extreme drop. At five years of tenure, however, both cohorts had experienced the financial crisis, so differences between the cohorts at that point are not primarily driven by differential financial market experiences.

We also examine the effects of automatic enrollment for different quartiles of the starting salary distribution at Company A. Starting salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Starting salary quartile cutoffs are determined by pooling employees in both cohorts together. Figure 2 shows the distribution of starting salaries for the pre-AE and post-AE cohorts. Table 2 shows the average starting salary within each quartile, as well as the fraction of the pre-AE cohort and the fraction of the post-AE cohort that falls within each quartile. The two distributions are quite similar.

Our primary outcome of interest is the ratio of 401(k) balances to starting salary. Therefore, our sample excludes employees who have starting salaries recorded as missing or zero. This selection criterion excludes 4.05% of hires, 4.98% of the pre-AE cohort and 3.16% of the post-AE cohort. Furthermore, our sample only includes employees in the United States, a

selection criterion that excludes 0.03% of hires. In addition, we include only hires who are still employed as of the end of one year of tenure. Turnover at this company is quite high, so this criterion excludes 43.54% of hires, 43.61% of the pre-AE cohort and 43.48% of the post-AE cohort. Finally, we treat employees who leave the company and who are later rehired as if they left the company permanently in order to maintain comparability across employees at a given level of tenure. This last rule affects 0.46% of observations.

Our final sample includes 15,730 employees, 7,664 in the pre-AE cohort and 8,066 in the post-AE cohort.

II. The Effect of Automatic Enrollment on 401(k) Plan Outcomes at Company A

We begin our analysis by comparing the demographic and employment characteristics of the pre-AE and post-AE cohorts. Table 3 reports means for the two cohorts for a number of different variables, as well as t-statistics from tests comparing those means. Both cohorts are nearly two-thirds female and nearly 31 years of age on average. Starting salaries, deflated to 2004 dollars, are slightly less than \$29,000 in both cohorts. Thus, the two cohorts are quite similar at baseline, suggesting that the differences between their 401(k) outcomes during the first five years of tenure are largely driven by the change in the design of the 401(k) plan. The major difference between the two cohorts' employment characteristics is that the pre-AE cohort has greater attrition. By the end of the fifth year of tenure, 33.8% of the pre-AE cohort remains employed at the company, while 37.2% of the post-AE cohort remains employed at the company, a statistically significant difference. Figure 3 shows that this difference emerges gradually over the first five years of tenure. To shed light on whether the differences in 401(k) outcomes for the two cohorts are the result of differential attrition, our primary analyses compare the cohorts at five years of tenure using two different approaches. First, we compare the cohorts without conditioning on continued employment at five years of tenure. Second, we compare the members of the pre-AE cohort who remained at the company at the end of five years of tenure to members of the post-AE cohort who remained at the company at the end of five years of tenure.

We will show below that the results do not seem to be driven by differential ~~driven~~attrition.

Table 3 also reports simple comparisons of the pre-AE and post-AE cohorts' 401(k) outcomes. As expected, given the change in plan eligibility rules, the pre-AE cohort becomes eligible for the plan 3.5 months after hire on average, while the post-AE cohorts becomes

eligible for the plan almost immediately (0.2 months after hire on average). Consistent with previous research on automatic enrollment (Madrian and Shea, 2001; Choi et al., 2002 and 2004; Beshears et al., 2008), automatic enrollment greatly accelerates plan participation. The pre-AE cohort begins participating in the 401(k) plan on average 12.5 months after becoming eligible and 16.0 months after being hired, and the post-AE cohort begins participating on average 0.4 months after becoming eligible and 0.5 months after being hired. At one year (five years) of tenure, the pre-AE cohort participation rate is 37.7% (83.1%), and the post-AE cohort participation rate is 98.4% (99.4%). Figure 4 shows this overall participation rate gap as a function of the number of years of tenure, and Figures 5A-D show that the same basic pattern holds for all four income quartiles. Note, however, that the lower income quartiles are less likely than the higher income quartiles to participate in the absence of automatic enrollment, but all income quartiles are approximately equally likely to participate under automatic enrollment.

Figure 6 shows the evolution of average contribution rates over time for the pre-AE and post-AE cohorts, conditional on continued employment. Figures 7A-D show the same information for the four quartiles of the income distribution. Both at the overall cohort level and within income quartiles, the post-AE cohort has higher average contribution rates than the pre-AE cohort, with the differences diminishing over the first five years of tenure. While higher income quartiles have higher average contribution rates than lower income quartiles, the difference in average contribution rates between the pre-AE and post-AE cohorts is similar in magnitude across quartiles. Even when we calculate average contribution rates for each cohort without conditioning on continued employment, the post-AE cohort exhibits higher contribution rates than the pre-AE cohort. The pre-AE cohort has an average contribution rate of 1.77% at one year of tenure and an average contribution rate without conditioning on continued employment of 1.51% at five years of tenure, while the post-AE cohort has an average contribution rate of 3.07% at one year of tenure and an average contribution rate without conditioning on continued employment of 1.84% at five years of tenure (see Table 3). Conditional on having a non-zero contribution rate, the pre-AE cohort actually has higher average contribution rates than the post-AE cohort. This finding suggests that automatic enrollment at a low default contribution rate increases average contribution rates by increasing the contributions of employees who would not have participated in the plan in the absence of automatic enrollment, as has been argued in previous work (Choi et al., 2004).

Turning to our main variables of interest, Figures 8A-B display the evolution of the average of balances in the 401(k) plan as a fraction of starting salary. Figure 8A calculates the average over all employees in a cohort, regardless of whether they continue to work at the company, and Figure 8B calculates the average over all employees in a cohort who remain at the company. Figures 9A-D replicate the calculation for Figure 8A but limit the sample to a given income quartile, while Figures 9E-H replicate the calculation for Figure 8B but limit the sample to a given income quartile. Among employees who remain at the company for five years, automatic enrollment increases 401(k) balances by approximately 10 percentage points of starting salary. This difference between the pre-AE and post-AE cohorts is approximately stable across the four income quartiles. When employees leave the company, they often take cash withdrawals from the plan or roll their balances over to another plan or to an IRA. Therefore, when balances in the 401(k) plan as a fraction of starting salary are averaged over all employees in a cohort, including those who leave the company, the difference between the pre-AE and post-AE cohorts is 6 percentage points of starting salary five years after hire. Again, this difference is approximately stable across income quartiles.

The pre-AE and post-AE cohorts have similar demographic characteristics. Nonetheless, we investigate whether the differences between the two groups are robust to controlling for observable characteristics. We perform ordinary least squares regressions of 401(k) balances five years after hire divided by starting salary on an indicator for being in the post-AE cohort, gender, age at hire, and, in some specifications, the logarithm of starting salary deflated to 2004 dollars. Table 4 reports the results from these regressions when the sample is all individuals in the two cohorts regardless of whether they continue to work for the company five years after hire (columns 1 and 6) or all individuals in the two cohorts in a given income quartile regardless of whether they continue to work for the company five years after hire (columns 2-5 and 7-10). Table 5 reports the results from these regressions when the sample is individuals in the two cohorts who remain at the company five years after hire (columns 1 and 6) or individuals in the two cohorts in a given income quartile who remain at the company five years after hire (columns 2-5 and 7-10). The control variables are often statistically significant. Females tend to have lower balances, and older employees tend to have higher balances. The coefficient on the logarithm of starting salary is sometimes positive and sometimes negative, perhaps because income may be positively related to the numerator of the outcome variable but also positively related to the

denominator of the outcome variable. Across specifications, the results in Table 4 align with the raw differences between the pre-AE and post-AE cohorts shown in Figures 8A and 9A-D. Similarly, the results in Table 5 align with the raw differences between the pre-AE and post-AE cohorts shown in Figures 8B and 9E-H.

We now explore how outcomes such as rollovers, loans, and withdrawals contribute to the overall evolution of 401(k) balances. First, we note that balances in the plan come from two basic sources, contributions (both employee and employer) while an individual is working at the company and roll-ins from other plans. Figures 10A and 11A show the average of plan balances due to contributions divided by starting salary, with Figure 10A calculating the average over all individuals in a cohort regardless of whether they continued to work at the company and with Figure 11A calculating the average over all individuals in a cohort who continued to work at the company. Figures 10B and 11B show the average of roll-in balances divided by starting salary, with Figure 10B calculating the average over all individuals in a cohort regardless of whether they continued to work at the company and with Figure 11B calculating the average over all individuals in a cohort who continued to work at the company. The differences in 401(k) balances as a fraction of starting salary between the pre-AE and post-AE cohorts are almost entirely driven by differences in the component of balances due to plan contributions while working at the company, as would be expected given that automatic enrollment affects contributions but does not directly affect roll-ins.

Roll-outs from the company 401(k) plan into another employer's plan or an IRA may also play a role in the evolution of 401(k) balances. To examine this possibility, we track roll-outs from the company 401(k) plan and add them to 401(k) balances that remain in the plan under the assumption that the roll-out balances grow at the rate of the S&P500 index. Figures 12A-B show the average of 401(k) balances plus roll-outs divided by starting salary for the two cohorts. Figure 12A calculates the average over all individuals in the cohort regardless of whether they remain employed at the company, while Figure 12B calculates the average over all individuals in the cohort who remain employed at the company. Figures 13A-D repeat the Figure 12A calculations but limit the sample to a given income quartile, and Figures 13E-H repeat the Figure 12B calculations but limit the sample to a given income quartile. The results in Figures 12A-B and 13A-H are approximately a parallel shift of the results in Figures 8A-B and 9A-H, indicating that roll-outs from the company 401(k) plan do not substantially differ between the

pre-AE and post-AE cohorts. If anything, adding roll-outs to 401(k) balances slightly augments the differences between the two cohorts.

We also study the incidence of 401(k) loans in the pre-AE and post-AE cohorts. The previous analyses subtracted loan amounts from 401(k) balances, but it is interesting to ask whether automatic enrollment increased loan activity. Figure 14A shows the average of 401(k) loan balances divided by starting salary among all individuals in a given cohort who remain employed at the company. The post-AE cohort indeed has greater loan balances outstanding than the pre-AE cohort, but the difference is less than 0.5 percentage points of starting salary when averaged across all individuals still employed at five years of tenure. Figure 14B shows the average of 401(k) loan balances divided by starting salary among all individuals in a given cohort who remain employed at the company and who have a loan outstanding. Interestingly, the pre-AE cohort now exhibits greater loan balances than the post-AE cohort, indicating that the overall difference in loan balances is driven by a greater number of individuals in the post-AE cohort taking a loan. Figures 15A-D repeat the calculations from Figure 14A but limit the sample to a given income quartile, and Figures 15E-H repeat the calculations from Figure 14B but limit the sample to a given income quartile. The differences between the pre-AE and post-AE cohorts are similar across income quartiles. Overall, differences in loan activity between the pre-AE and post-AE cohorts only slightly offset the increase in 401(k) balances driven by automatic enrollment.

Finally, we directly analyze differences in distributions from the 401(k) plan between the pre-AE and post-AE cohorts. We observe roll-outs from the company's 401(k) plan into another employer's plan or into an IRA and track them cumulatively over time by assuming that they grow at the rate of the S&P500 index. Figures 16A-B show the average of cumulative roll-outs divided by starting salary for the pre-AE and post-AE cohorts, with Figure 16A averaging over all employees in a cohort regardless of whether they continue to work at the company and with Figure 16B averaging over employees in a cohort who continue to work at the company. The post-AE cohort has larger cumulative roll-outs than the pre-AE cohort when averaging across all employees regardless of whether they continue to work at the company. Five years after hire, the difference is approximately 0.5 percentage points of starting salary. However, it is uncommon to roll balances out of a 401(k) plan while still employed at the company, so employees who

continue to work at the company have low cumulative roll-outs and do not exhibit a difference between the pre-AE and post-AE cohorts.

We also observe cash withdrawals from the 401(k) plan. As with roll-outs, we track cash withdrawals cumulatively over time by assuming that they grow at the rate of the S&P500. Figures 17A-B show the average of cumulative cash withdrawals divided by starting salary for the two cohorts. Figure 17A calculates the average over all individuals in a cohort regardless of whether they continue to work at the company, while Figure 17B calculates the average over individuals in a cohort who continue to work at the company. Five years after hire, the post-AE cohort has cumulative cash withdrawals that are slightly more than one percentage point of starting salary higher than the cumulative cash withdrawals of the pre-AE cohort, averaging across individuals regardless of whether they continue to work at the company. Cash withdrawals, like roll-outs, are rare among employees who still work at the company. Nonetheless, the post-AE cohort has cumulative cash withdrawals that are approximately 0.2 percentage points of starting salary higher than the cumulative cash withdrawals of the pre-AE cohort five years after hire when conditioning on employees who still work at the company.

The plan rules governing distributions upon termination play an important role in the differences in roll-out and cash withdrawal patterns between the pre-AE and post-AE cohorts. Figure 18 breaks out employees in a given cohort who still work at the company into four categories: those who have zero 401(k) balances, those who have 401(k) balances greater than zero but less than \$1,000, those who have 401(k) balances greater than \$1,000 but less than \$5,000, and those who have 401(k) balances greater than \$5,000. Figure 19 repeats the calculations for Figure 18 but limits the sample to employees who stopped working for the company in the following year. The two figures document that the pre-AE cohort has many more individuals with zero balances than the post-AE cohort, especially in the first few years after hire. During those first few years after hire, many individuals in the post-AE cohort have 401(k) balances greater than zero but less than \$1,000. The default outcome when an employee terminates with balances greater than zero but less than \$1,000 is for the employee to receive a cash withdrawal for the full plan balance. The top panel of Figure 20 shows that when individuals receive total distributions from the plan for balances between zero and \$1,000, those individuals overwhelmingly receive cash withdrawals. Therefore, the 401(k) plan's default distribution option is a mechanism by which the post-AE cohort exhibits higher cumulative cash

withdrawals than the pre-AE cohort. By the third and fourth years of tenure, many individuals in the post-AE cohort have 401(k) balances between \$1,000 and \$5,000. The default outcome when an employee terminates with balances between \$1,000 and \$5,000 is for the balances to be rolled into an IRA. The middle panel of Figure 20 shows that individuals who receive total distributions when terminating with balances between \$1,000 and \$5,000 frequently roll over those balances. Thus, the 401(k) plan's default distribution option is also a mechanism by which the post-AE cohort exhibits higher cumulative roll-outs than the pre-AE cohort.

Overall, the post-AE cohort has higher average cumulative roll-outs and higher average cumulative cash withdrawals compared to the pre-AE cohort. However, these differences only slightly counteract the greater 401(k) balance accumulations of the post-AE cohort relative to the pre-AE cohort.

III. Conclusion

Our analysis of Company A indicates that automatic enrollment increases 401(k) balances five years after hire. This effect holds across all income quartiles and is only slightly offset by the post-AE cohort's higher loan balances, cumulative roll-outs, and cumulative cash withdrawals. An important caveat is that the current analysis only considers the experience of one company that instituted automatic enrollment. Future research should examine other companies that introduced automatic enrollment, as different plan designs and different employee populations may lead to different savings outcomes. In addition, it would be valuable to study other margins along which household balance sheets may adjust in response to automatic enrollment, such as the accumulation of consumer debt. Nonetheless, this paper provides evidence consistent with the hypothesis that automatic enrollment leads to greater overall wealth accumulation.

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Table 1. 401(k) Plan Features

<i>Eligibility</i>	
<i>Eligibility to make employee contributions</i>	Before AE: Employees scheduled to work at least 20 hours per week can enroll on the first day of the month following three full months of continuous service After AE: All employees can enroll upon hire
<i>Eligibility for employer contributions</i>	First day of the month following one year of service in which the employee worked at least 1,000 hours and was actively employed as of the last business day of the year
<i>Automatic Enrollment</i>	Eligible employees have five days to opt out and are otherwise enrolled as of the next enrollment date following hire—which is, on average, a ten-day period—at a 2% pre-tax contribution rate in a target-date fund appropriate given age
<i>Automatic Escalation</i>	Offered starting one month after AE implementation as opt-in strategy in which escalation occurs January 1 st
<i>Contributions</i>	
<i>Employee contributions</i>	Before 1/1/2006: up to 50% of pay After 1/1/2006: up to 75% of pay
<i>Employer contributions</i>	Employer match of 100% towards company stock on first 4% of pay contributed by employee; dividends are reinvested in company stock, but the participant can elect to have them distributed
<i>Match Vesting</i>	Immediate
<i>Loans</i>	
<i>Total loan limit</i>	At most two loans outstanding at a time
<i>Loan amount minimum</i>	\$1,000
<i>Loan amount maximum</i>	The lesser of 50% of the participant's account balance or \$50,000 minus the participant's highest outstanding loan balance during the past 12 months
<i>Distributions</i>	Lump sum payment; accounts balances less than \$1,000 are distributed at termination, and the account's balance must be greater than \$5,000 to be kept following separation
Source: Summary Plan Description	

Table 2. The Distribution of Income

	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Average starting salary	\$11,820	\$19,310	\$26,609	\$57,710
Percentage of pre-AE cohort	25.04%	24.32%	25.00%	25.64%
Percentage of post-AE cohort	25.13%	25.48%	25.14%	24.25%

Annualized salaries as of year of hire. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Table 3. Summary Statistics on Demographic Characteristics and Savings Plan Outcomes

	Pre-AE cohort	Post-AE cohort	t-statistic for difference
Demographic Characteristics			
<i>Fraction female</i>	64.6%	65.9%	1.70
<i>Age</i>	30.7	30.6	-0.39
<i>Salary*</i>	\$28,956	\$28,717	-0.69
<i>Months to eligibility</i>	3.5	0.2	-174.60
<i>Months to participation from eligibility</i>	12.5	0.4	-56.54
<i>Months to participation from hire</i>	16.0	0.5	-72.04
<i>Fraction employed as of five years after hire</i>	33.8%	37.2%	19.85
Savings plan outcomes (at one year after hire)			
<i>Participation rate</i>	37.7%	98.4%	108.79
<i>Average contribution rate</i>	1.77%	3.07%	21.77
<i>Average contribution rate (positive contributors only)</i>	4.87%	3.19%	-17.21
<i>Balances/starting salary</i>	0.02	0.04	17.52
<i>Balances including rollovers/starting salary</i>	0.02	0.04	17.50
<i>Percentage at 4% match</i>	5.5%	5.0%	-1.40
<i>Percentage <50 years at contribution limit**</i>	0.0%	0.0%	-1.05
<i>Average total outstanding loans (all employed)</i>	0.00	0.01	2.33
<i>Average total outstanding loans (employed with loans)</i>	1.21	1.15	-0.51
<i>Average loan balances (all employed)</i>	\$10	\$31	2.01
<i>Average loan balances (employed with loans)</i>	\$5,224	\$7,620	0.72
Savings plan outcomes (at five years after hire)			
<i>Participation rate</i>	83.1%	99.4%	23.29
<i>Average contribution rate</i>	1.51%	1.84%	5.41
<i>Average contribution rate (positive contributors only)</i>	4.91%	4.61%	-2.06
<i>Balances/starting salary</i>	0.13	0.19	9.41
<i>Balances including rollovers/starting salary</i>	0.16	0.22	10.15
<i>Percentage at 4% match</i>	7.4%	8.3%	2.16
<i>Percentage <50 years at contribution limit**</i>	0.0%	0.0%	0.39
<i>Average total outstanding loans (all employed)</i>	0.21	0.33	7.26
<i>Average total outstanding loans (employed with loans)</i>	1.5	1.5	1.31
<i>Average loan balances (all employed)</i>	\$234	\$327	3.37
<i>Average loan balances (employed with loans)</i>	\$4,693	\$3,961	-2.10
Sample size	N=7,664	N=8,066	

*Growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey is used to deflate employee salaries to 2004 dollars.

**The contribution limit was 50% before AE and 75% after. Includes catch-up contributions.

Table 4. Initial Hires 401(k) Balances in Year 5 of Tenure/Starting Salary

	(1) All	(2) 1 st Quartile	(3) 2 nd Quartile	(4) 3 rd Quartile	(5) 4 th Quartile	(6) All	(7) 1 st Quartile	(8) 2 nd Quartile	(9) 3 rd Quartile	(10) 4 th Quartile
Automatic Enrollment Cohort	0.0558*** (0.00569)	0.0502*** (0.0150)	0.0466*** (0.00598)	0.0482*** (0.00828)	0.0860*** (0.0126)	0.0527*** (0.00539)	0.0559*** (0.0121)	0.0499*** (0.00630)	0.0444*** (0.00846)	0.0737*** (0.0123)
Female	-0.0859*** (0.00700)	-0.0905** (0.0383)	-0.0174** (0.00781)	-0.0448*** (0.00939)	-0.0329*** (0.0126)	-0.0494*** (0.0116)	-0.0863** (0.0352)	-0.0197** (0.00790)	-0.0396*** (0.00952)	0.00624 (0.0126)
Age at Hire	0.00534*** (0.000297)	0.00356*** (0.00116)	0.00245*** (0.000356)	0.00229*** (0.000557)	0.00432*** (0.000655)	0.00335*** (0.000524)	0.00357*** (0.00117)	0.00245*** (0.000355)	0.00202*** (0.000575)	0.000825 (0.000673)
Log(Starting Salary in 2004 dollars)						0.0900*** (0.0153)	-0.0885 (0.0659)	-0.0982** (0.0442)	0.159*** (0.0346)	0.247*** (0.0204)
Constant	0.0286*** (0.00944)	0.0636** (0.0264)	0.0118 (0.0116)	0.0765*** (0.0173)	0.119*** (0.0247)	-0.842*** (0.151)	0.885 (0.627)	0.984** (0.437)	-1.542*** (0.347)	-2.456*** (0.216)
Observations	15,722	3,945	3,918	3,941	3,918	15,722	3,945	3,918	3,941	3,918
R-squared	0.043	0.012	0.031	0.020	0.024	0.061	0.016	0.032	0.025	0.066

Robust standard errors in parentheses. Dependent variable is 401(k) balances/starting salary. Includes all employees hired one year before and one year after the implementation of automatic enrollment. Quartiles are based on starting salary in 2004 dollars. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

***p-value<.01 ** p-value<.05 *p-value<.1

Table 5. Employee 401(k) Balances in Year 5 of Tenure/Starting Salary

	(1) All	(2) 1 st Quartile	(3) 2 nd Quartile	(4) 3 rd Quartile	(5) 4 th Quartile	(6) All	(7) 1 st Quartile	(8) 2 nd Quartile	(9) 3 rd Quartile	(10) 4 th Quartile
Automatic Enrollment Cohort	0.103*** (0.0134)	0.0918 (0.0673)	0.124*** (0.0132)	0.0792*** (0.0164)	0.111*** (0.0181)	0.102*** (0.0128)	0.115** (0.0532)	0.133*** (0.0139)	0.0758*** (0.0168)	0.0996*** (0.0176)
Female	-0.155*** (0.0154)	-0.312* (0.161)	-0.0505*** (0.0183)	-0.101*** (0.0195)	-0.0834*** (0.0179)	-0.122*** (0.0307)	-0.276** (0.136)	-0.0566*** (0.0186)	-0.0948*** (0.0201)	-0.0392** (0.0179)
Age at Hire	0.00355*** (0.000531)	0.00303 (0.00324)	6.87e-05 (0.000617)	0.00105 (0.00102)	0.00307*** (0.000925)	0.00211* (0.00111)	0.00269 (0.00303)	-1.71e-05 (0.000610)	0.000889 (0.00105)	-0.000804 (0.000958)
Log(Starting Salary in 2004 dollars)						0.0741* (0.0403)	-0.379 (0.263)	-0.254*** (0.0962)	0.154** (0.0684)	0.264*** (0.0282)
Constant	0.338*** (0.0202)	0.543*** (0.118)	0.238*** (0.0238)	0.338*** (0.0321)	0.411*** (0.0364)	-0.394 (0.407)	4.064 (2.545)	2.759*** (0.954)	-1.229* (0.690)	-2.345*** (0.299)
Observations	5,587	920	1,241	1,471	1,955	5,587	920	1,241	1,471	1,955
R-squared	0.040	0.021	0.072	0.039	0.034	0.047	0.046	0.078	0.042	0.083

Robust standard errors in parentheses. Dependent variable is 401(k) balances/starting salary. Includes all employees hired one year before and one year after automatic enrollment who are still employed as of the end of the fifth year of tenure. Quartiles are based on starting salary in 2004 dollars. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

***p-value<.01 ** p-value<.05 *p-value<.1

Figure 1. Distribution of Hire Dates

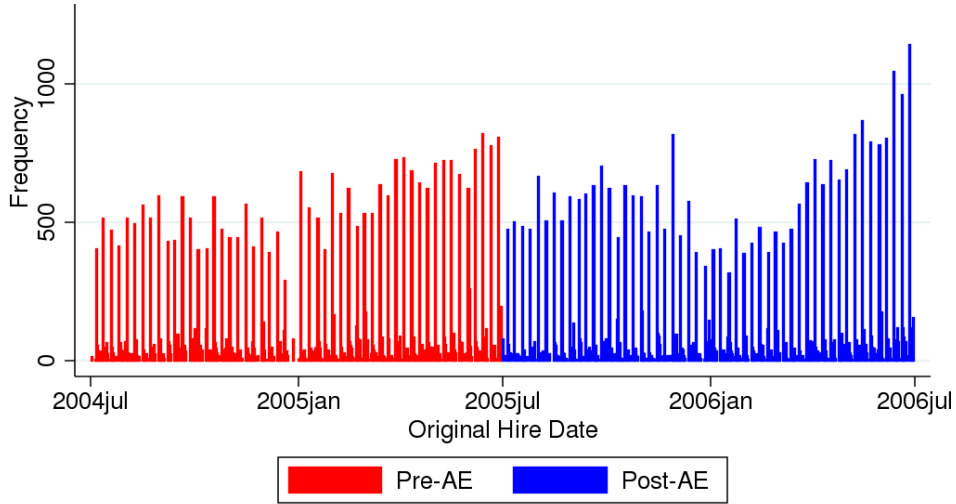
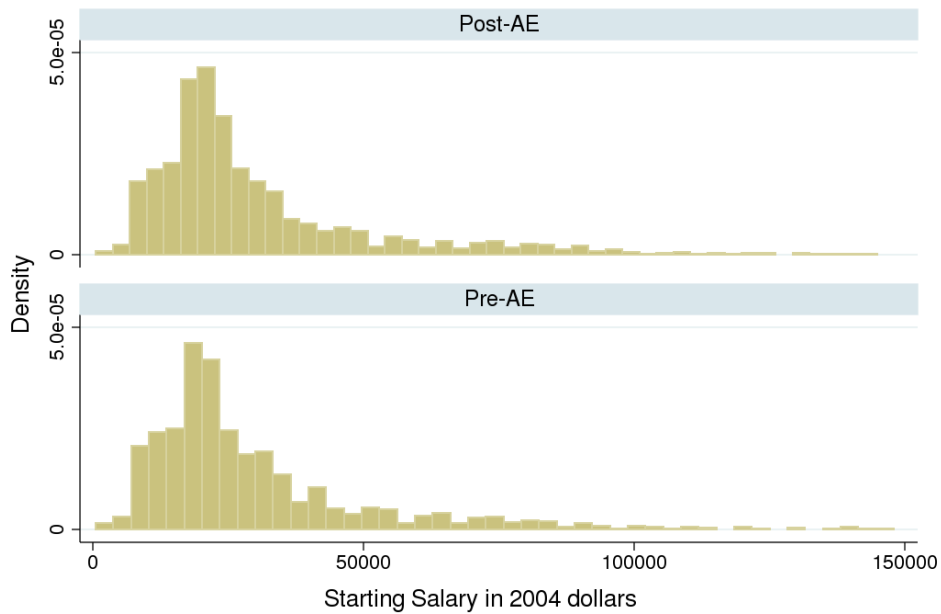


Figure 2. Distribution of Starting Salaries



Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. [The graph excludes starting salaries greater than \\$150,000, which comprise .16% of the pre-AE cohort and .29% of the post-AE cohort.](#)

Figure 3. Employment

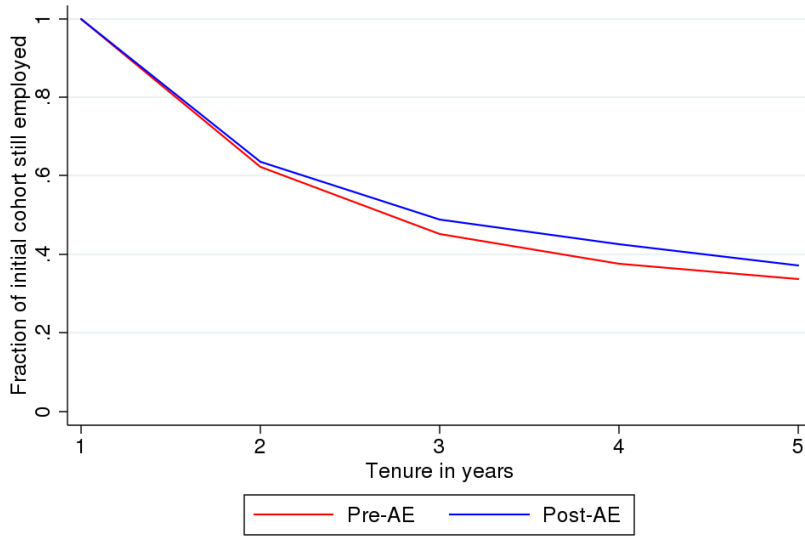
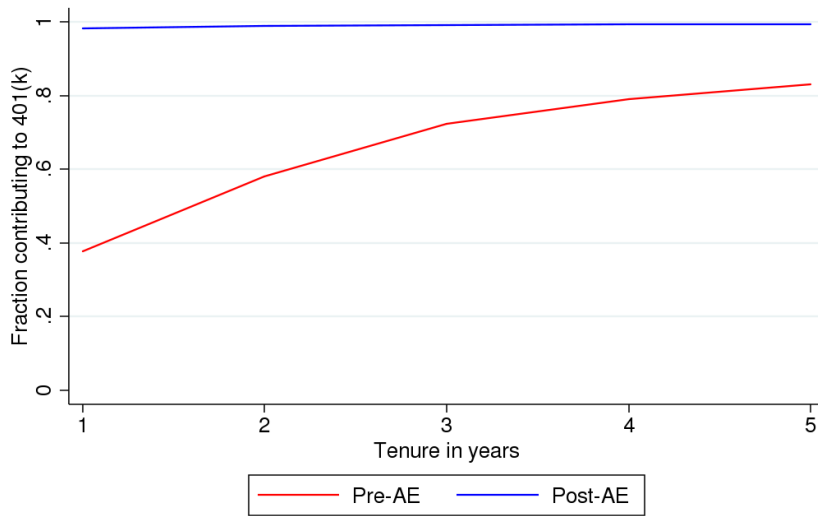
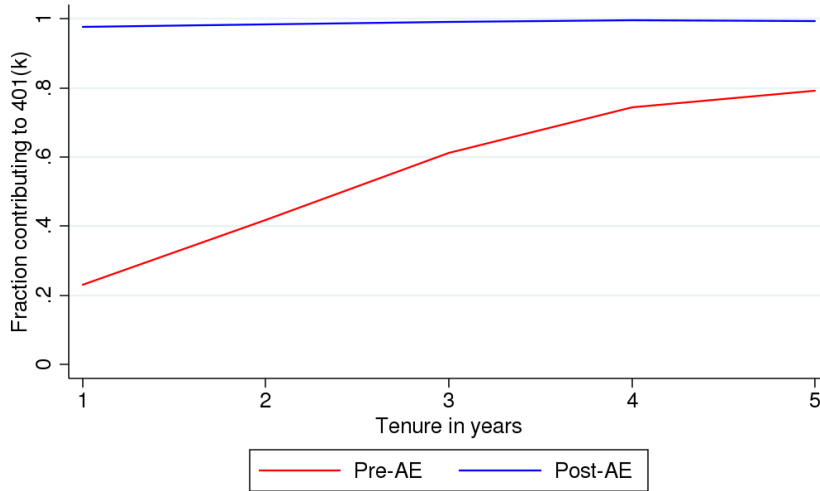


Figure 4. Employee 401(k) Participation



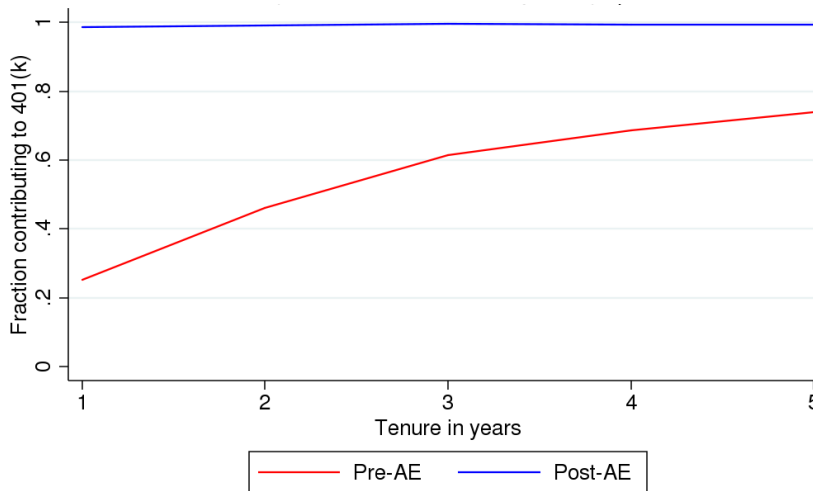
Participation is defined as having positive 401(k) at any point of the year. Includes only those employed as of year-end.

Figure 5A. 1st Salary Quartile Employee 401(k) Participation



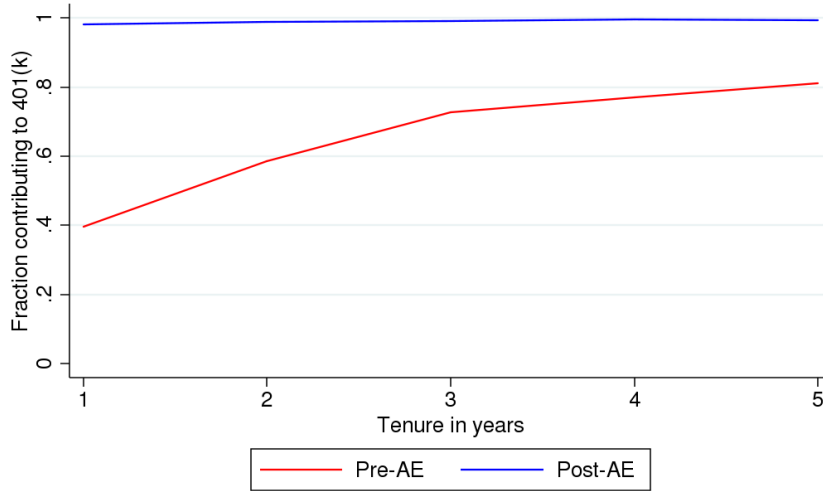
Participation is defined as having positive 401(k) at any point of the year. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 5B. 2nd Salary Quartile Employee 401(k) Participation



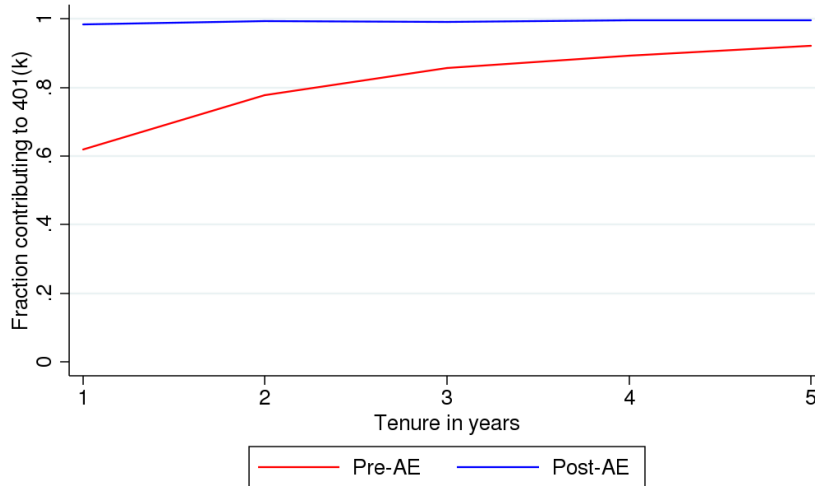
Participation is defined as having positive 401(k) at any point of the year. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 5C. 3rd Salary Quartile Employee 401(k) Participation



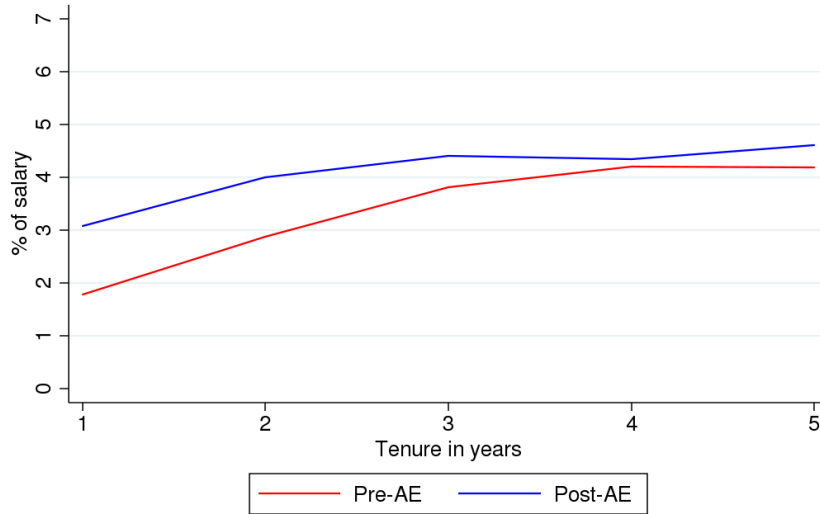
Participation is defined as having positive 401(k) at any point of the year. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 5D. 4th Salary Quartile Employee 401(k) Participation



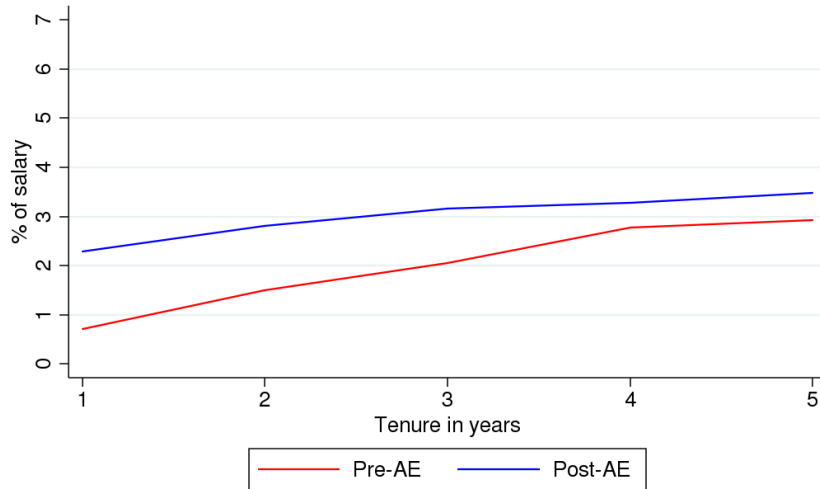
Participation is defined as having positive 401(k) at any point of the year. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 6. Employee Contribution Rates



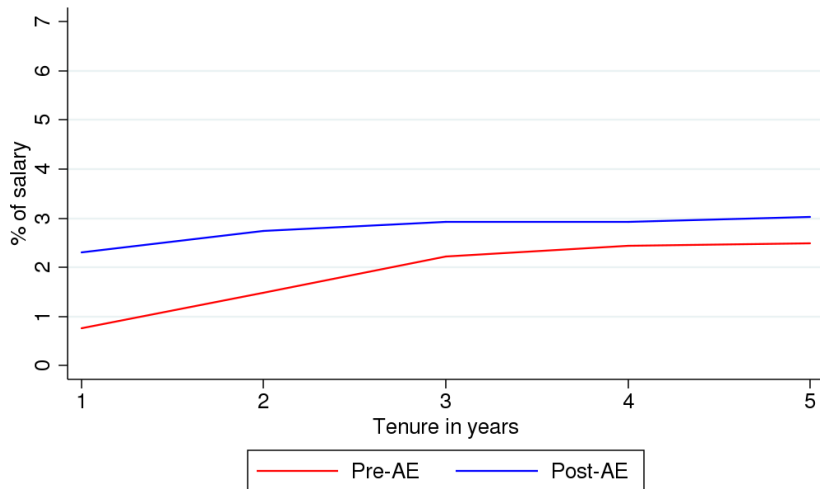
Contribution rate is the sum of before-tax, after-tax, and Roth contributions as a percentage of salary. Includes only those employed as of year-end.

Figure 7A. 1st Salary Quartile Employee Contribution Rates



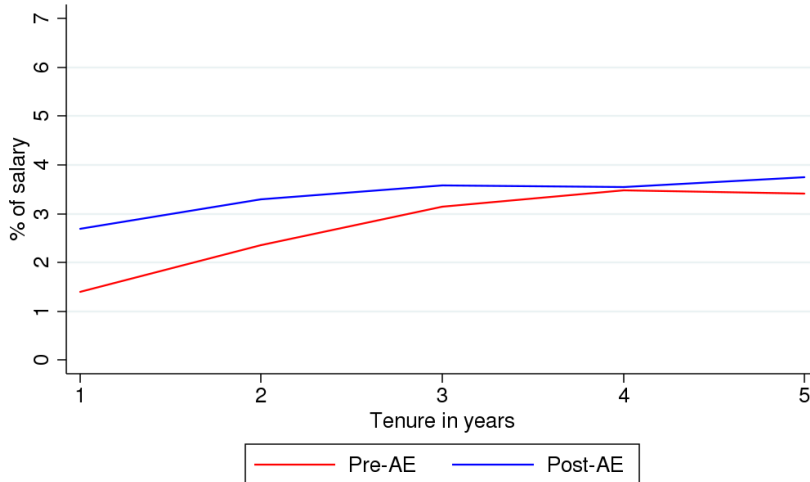
Contribution rate is the sum of before-tax, after-tax, and Roth contributions as a percentage of salary. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 7B. 2nd Salary Quartile Employee Contribution Rates



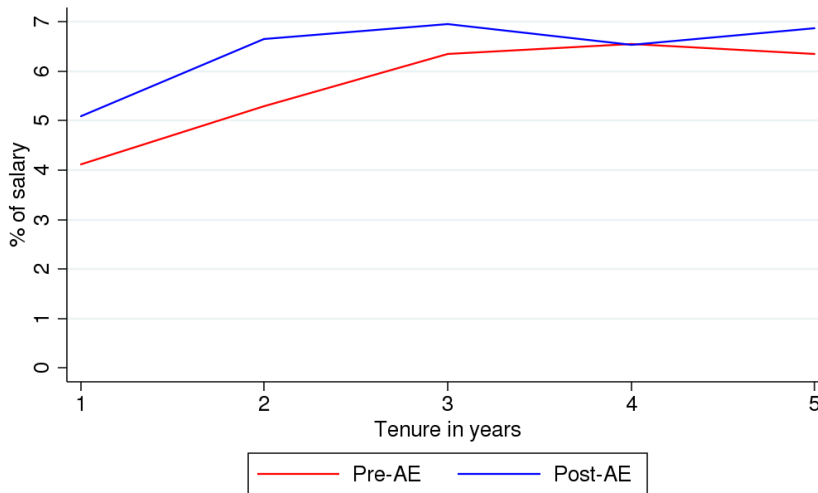
Contribution rate is the sum of before-tax, after-tax, and Roth contributions as a percentage of salary. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 7C. 3rd Salary Quartile Employee Contribution Rates



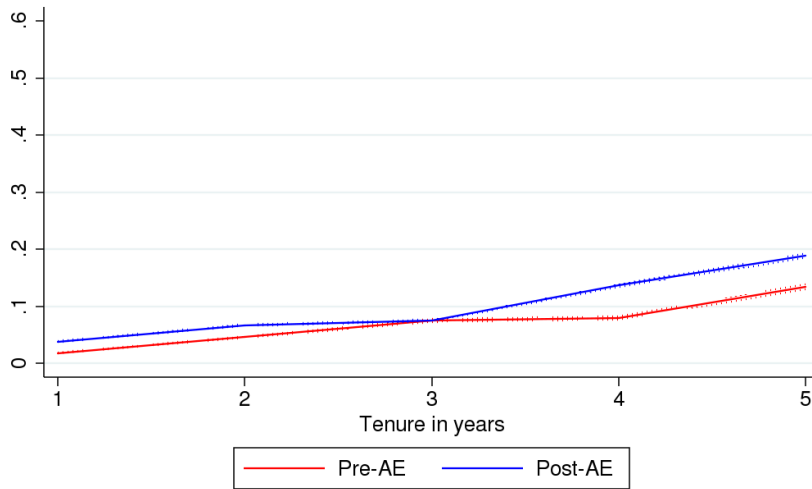
Contribution rate is the sum of before-tax, after-tax, and Roth contributions as a percentage of salary. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 7D. 4th Salary Quartile Employee Contribution Rates



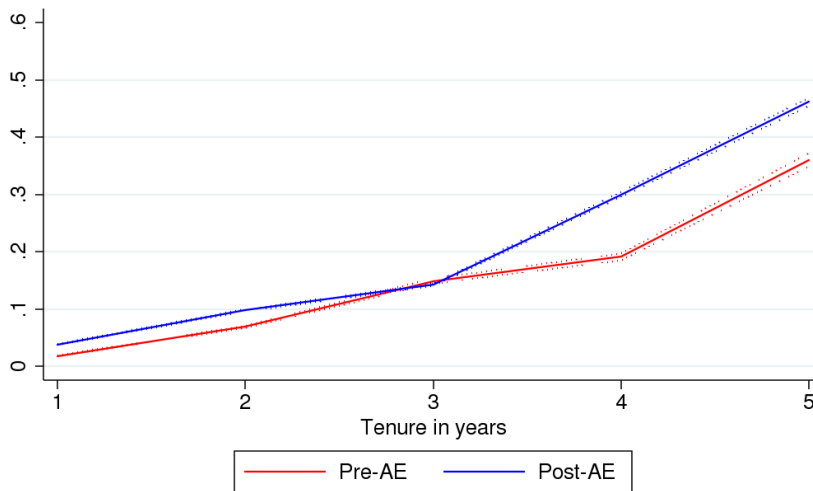
Contribution rate is the sum of before-tax, after-tax, and Roth contributions as a percentage of salary. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey.

Figure 8A. Initial Hire 401(k) Balances/Starting Salary



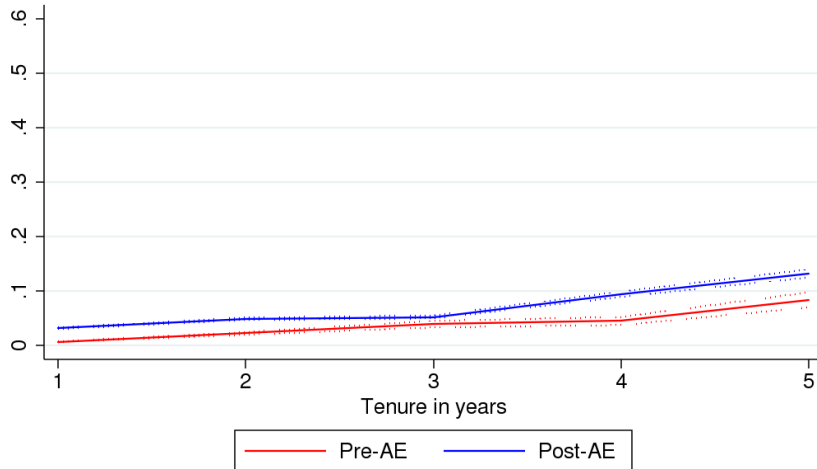
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 8B. Employee 401(k) Balances/Starting Salary



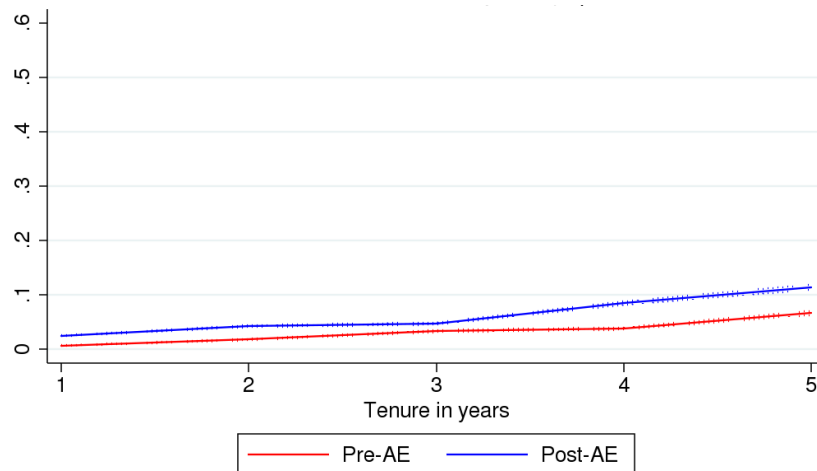
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9A. 1st Salary Quartile Initial Hire 401(k) Balances/Starting Salary



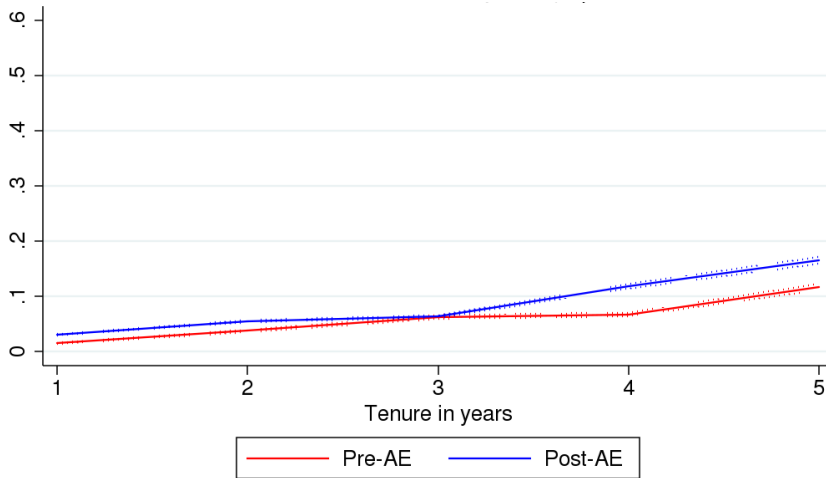
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9B. 2nd Salary Quartile Initial Hire 401(k) Balances/Starting Salary



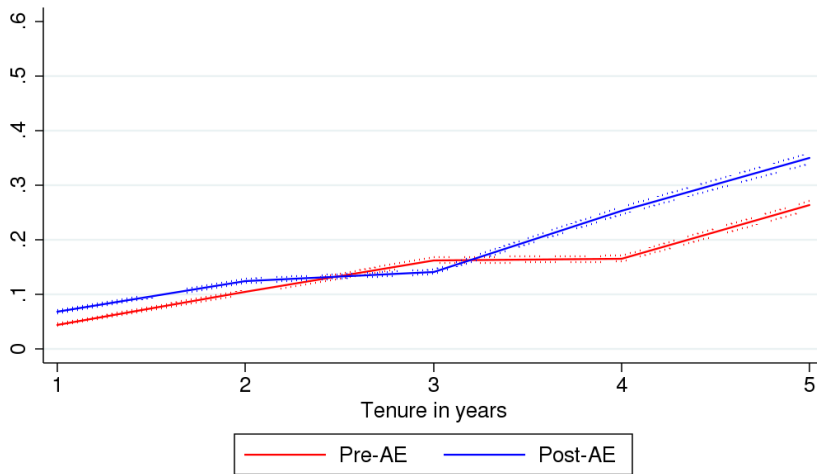
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9C. 3rd Salary Quartile Initial Hire 401(k) Balances/Starting Salary



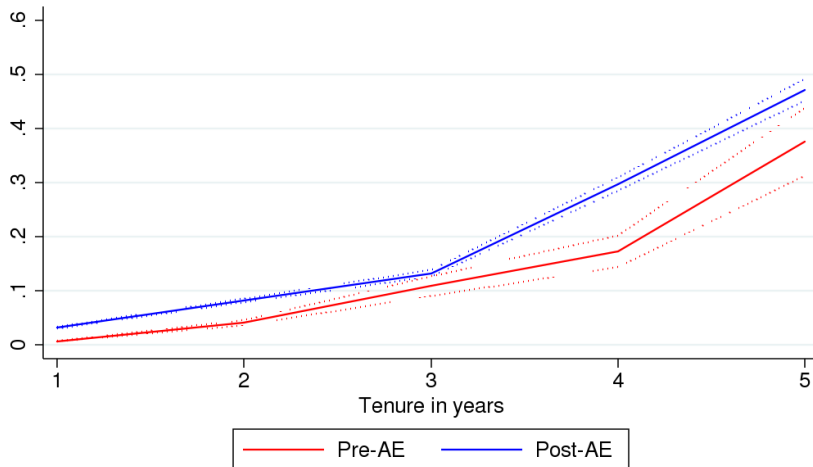
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9D. 4th Salary Quartile Initial Hire 401(k) Balances/Starting Salary



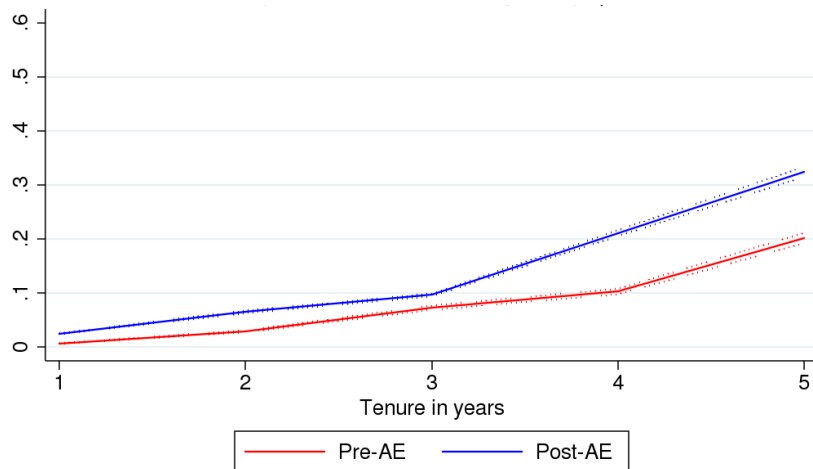
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9E. 1st Salary Quartile Employee 401(k) Balances/Starting Salary



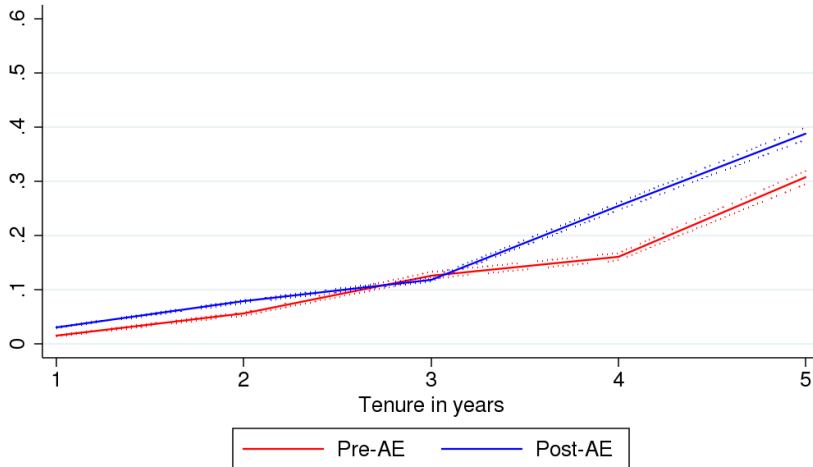
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9F. 2nd Salary Quartile Employee 401(k) Balances/Starting Salary



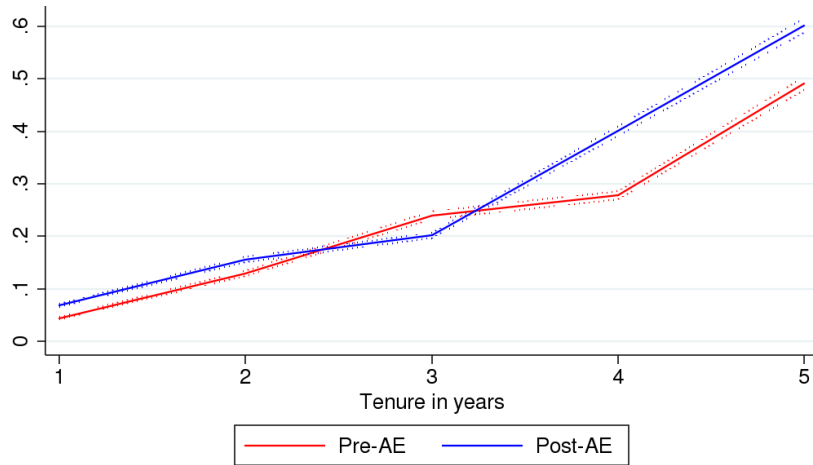
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9G. 3rd Salary Quartile Employee 401(k) Balances/Starting Salary



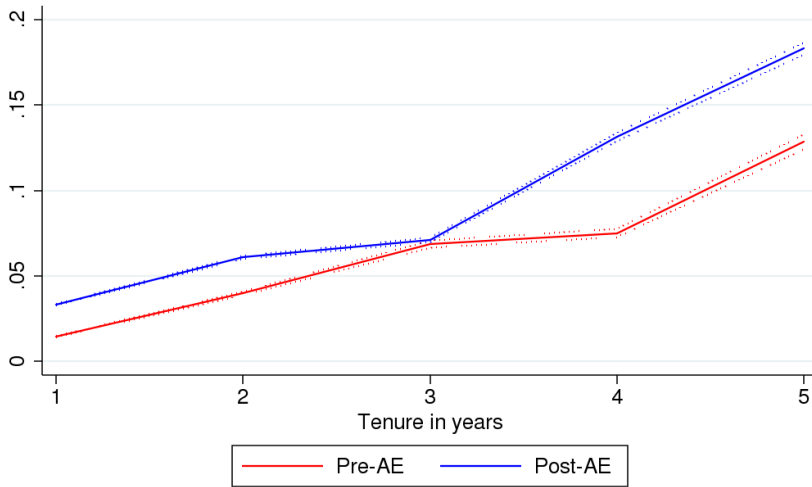
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 9H. 4th Salary Quartile Employee 401(k) Balances/Starting Salary



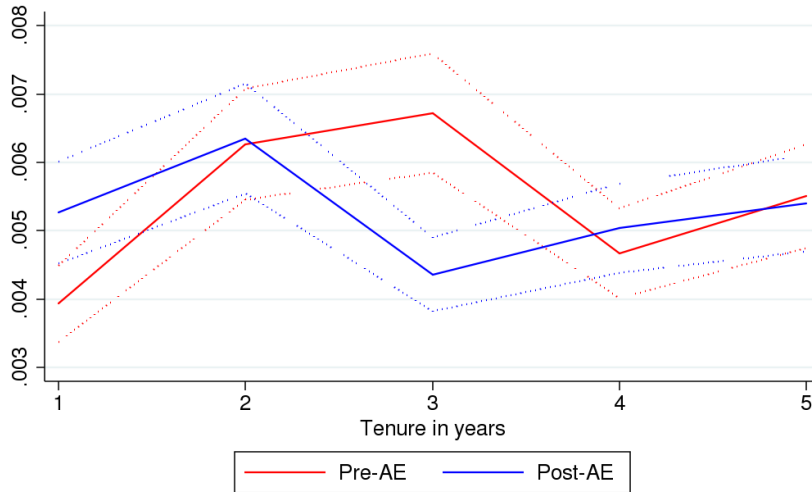
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 10A. Initial Hire Contribution Balances/Starting Salary



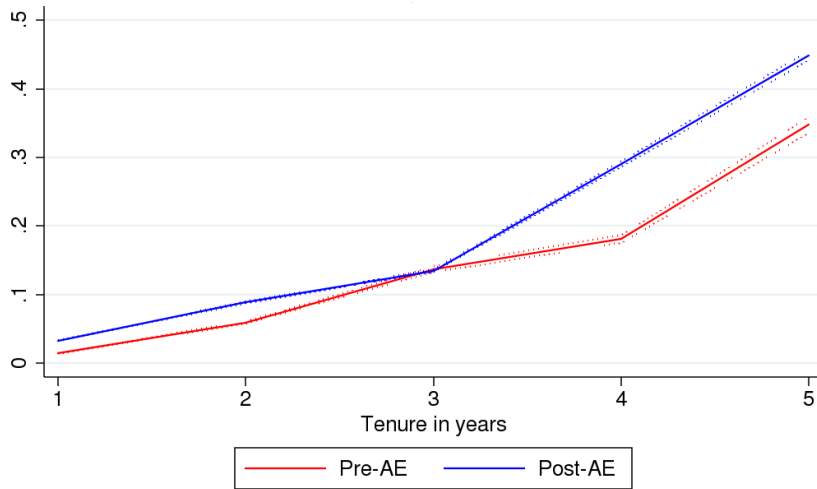
Contribution balances include only before-tax, after-tax, and Roth accounts created while participants were members of the plan. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 10B. Initial Hire Roll-in Balances/Starting Salary



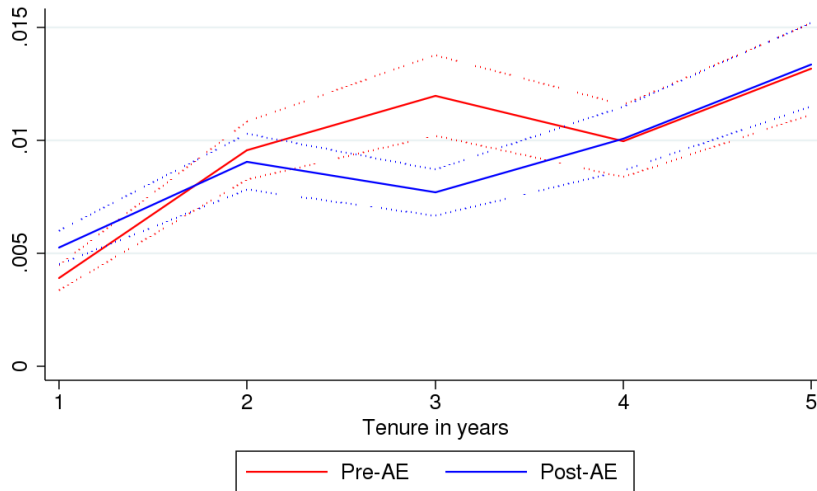
Roll-in balances include all accounts created before participants were members of the plan that were rolled into the plan. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 11A. Employee Contribution Balances/Starting Salary



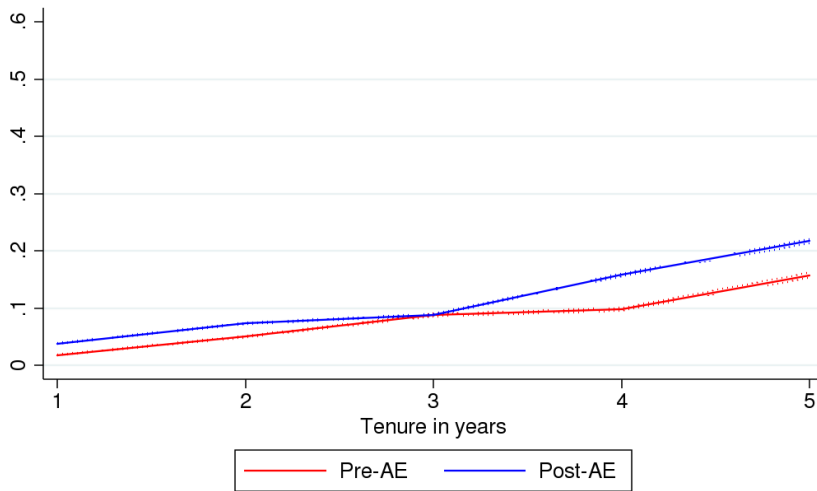
Contribution balances include only before-tax, after-tax, and Roth accounts created while participants were members of the plan. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 11B. Employee Roll-in Balances/Starting Salary



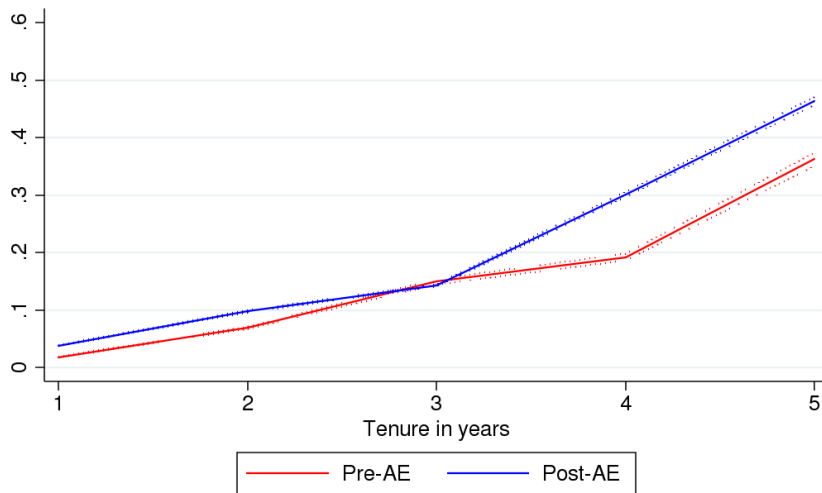
Roll-in balances include all accounts created before participants were members of the plan that were rolled into the plan. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 12A. Initial Hire 401(k) Balances with Roll-outs/Starting Salary



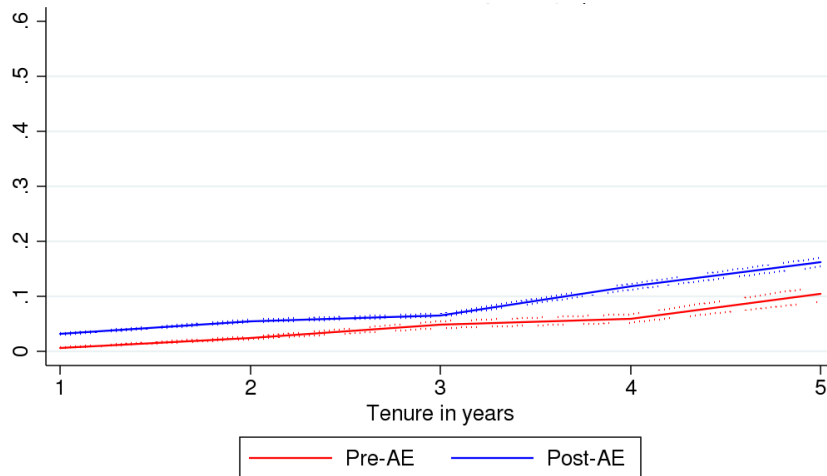
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 12B. Employee 401(k) Balances with Roll-outs/Starting Salary



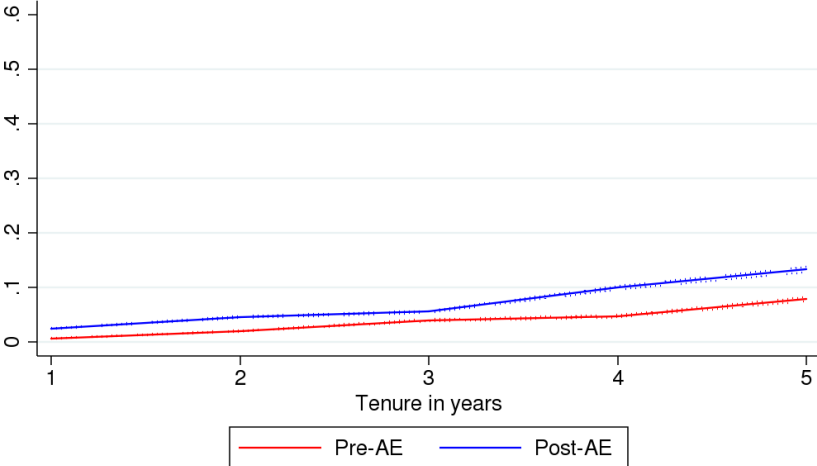
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13A. 1st Salary Quartile Initial Hire 401(k) Balances with Roll-outs/Starting Salary



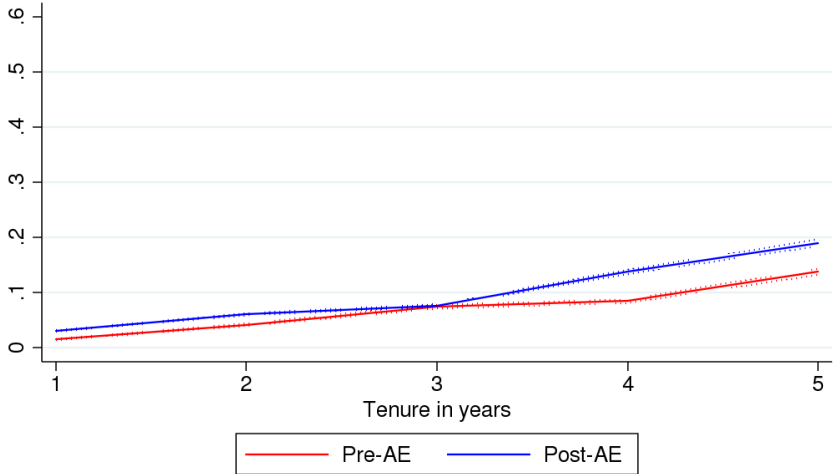
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13B. 2nd Salary Quartile Initial Hire 401(k) Balances with Roll-outs/Starting Salary



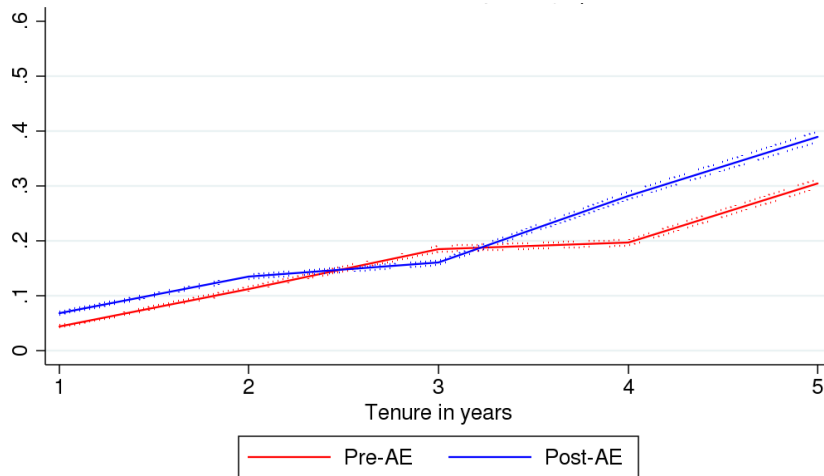
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13C. 3rd Salary Quartile Initial Hire 401(k) Balances with Roll-outs/Starting Salary



401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

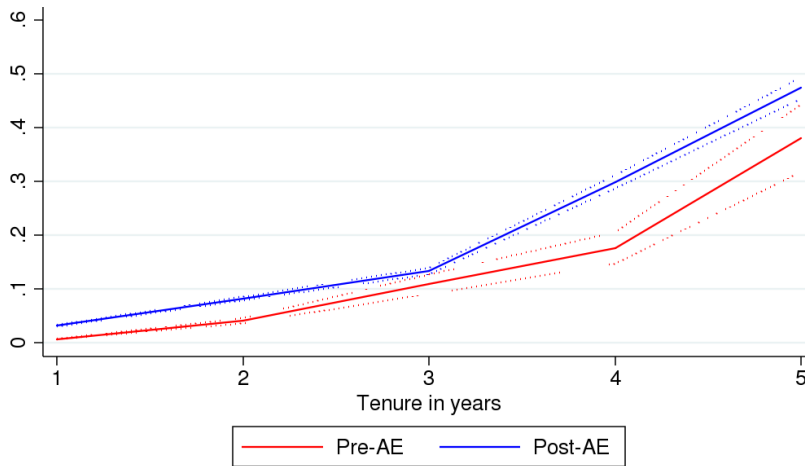
Figure 13D. 4th Salary Quartile Initial Hire 401(k) Balances with Roll-outs/Starting Salary



401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

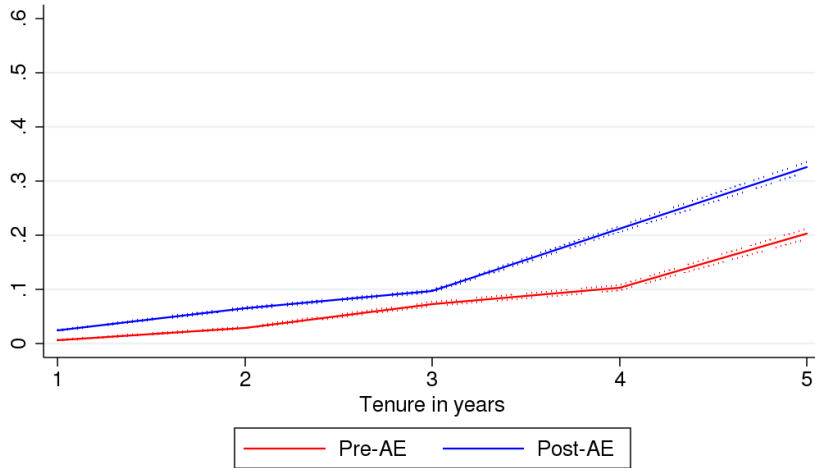
Figure 13E. 1st Salary Quartile Employee 401(k) Balances with Roll-outs/Starting Salary

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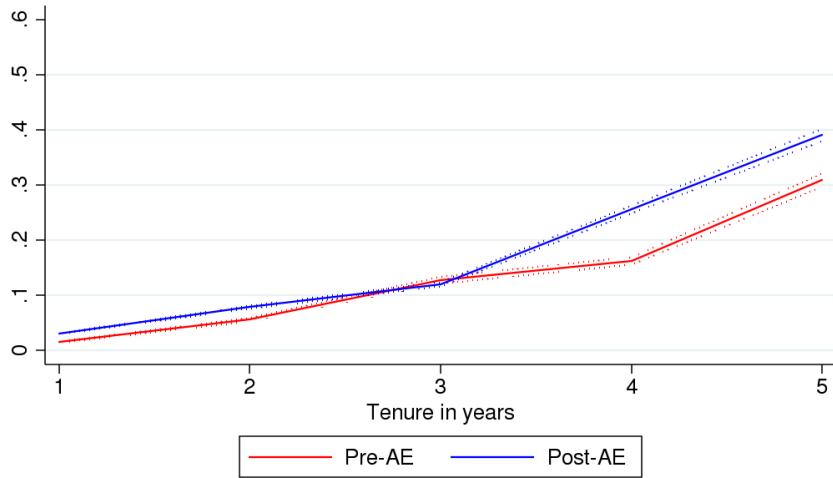
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13F. 2nd Salary Quartile Employee 401(k) Balances with Roll-outs/Starting Salary



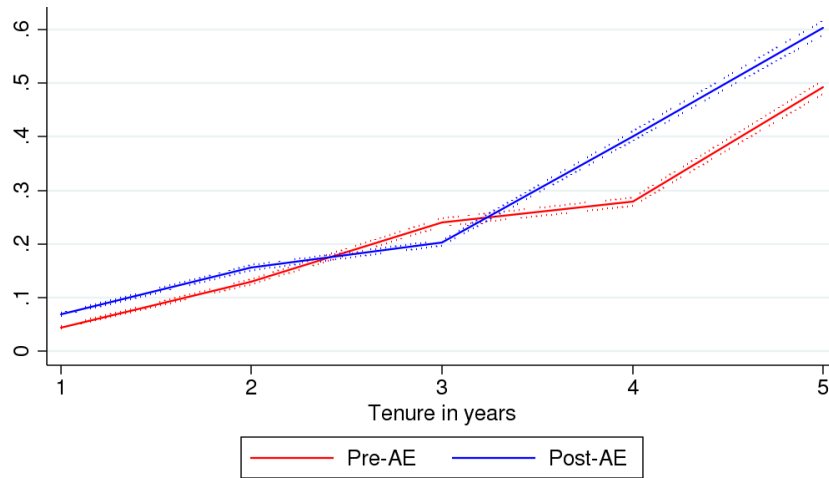
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13G. 3rd Salary Quartile Employee 401(k) Balances with Roll-outs/Starting Salary



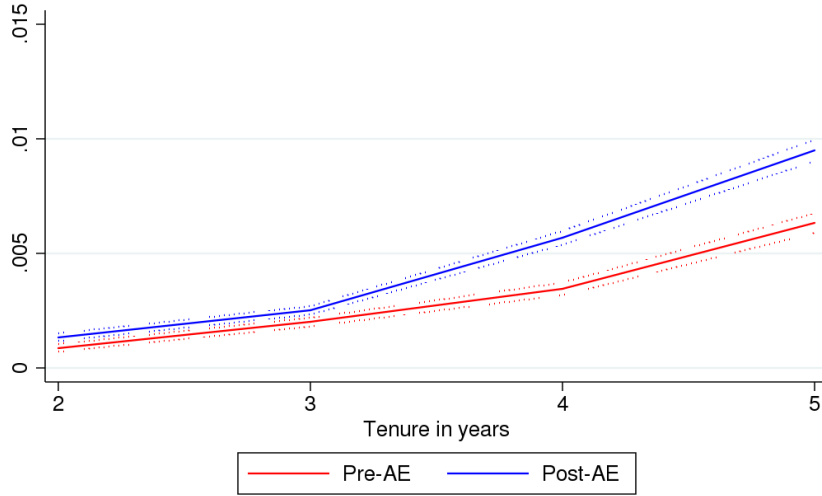
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 13H. 4th Salary Quartile Employee 401(k) Balances with Roll-outs/Starting Salary



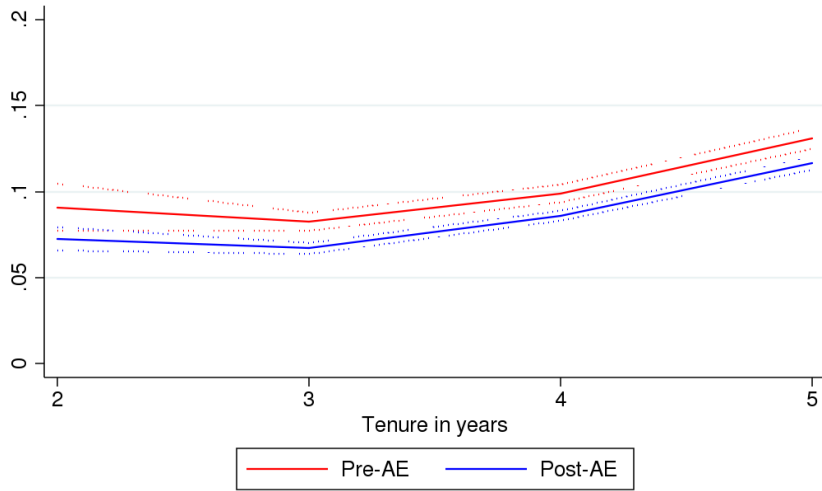
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 14A. Employee Outstanding Loan Balances/Starting Salary



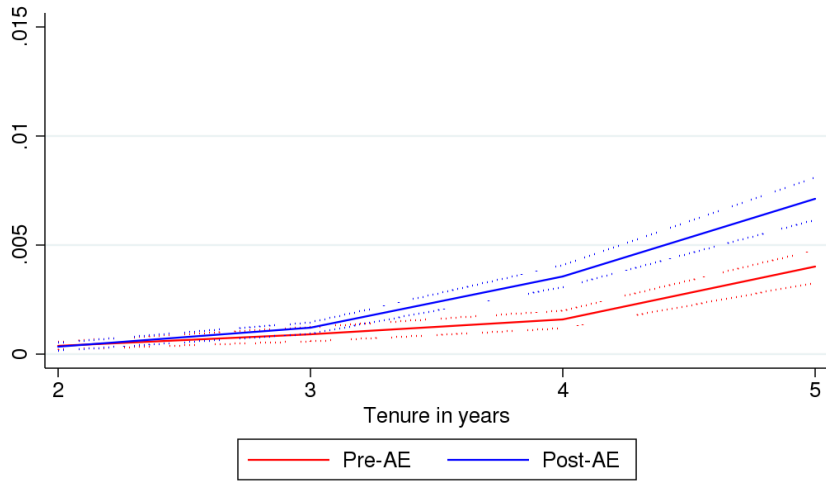
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 14B. Employee with Loan Outstanding Loan Balances/Starting Salary



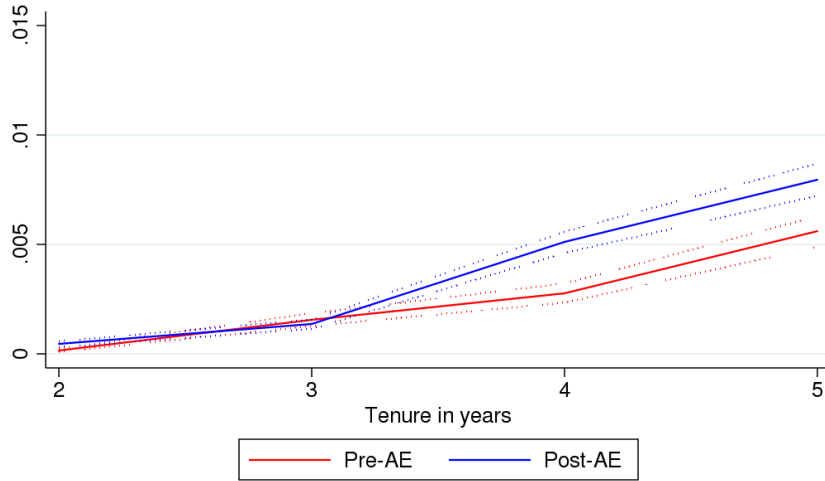
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end with at least one outstanding loan. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15A. 1st Salary Quartile Employee Outstanding Loan Balances/Starting Salary



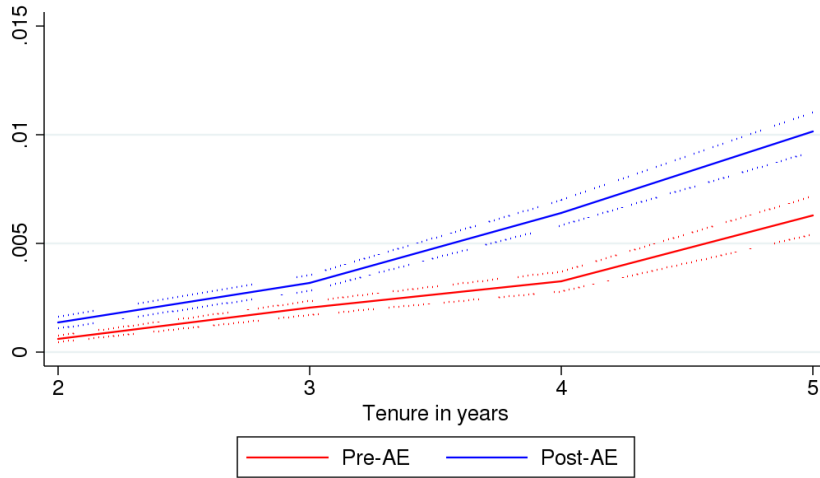
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15B. 2nd Salary Quartile Employee Outstanding Loan Balances/Starting Salary



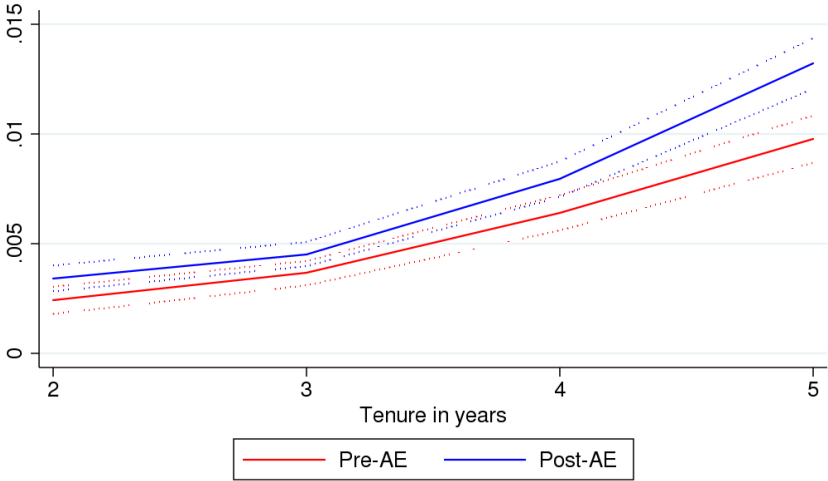
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15C. 3rd Salary Quartile Employee Outstanding Loan Balances/Starting Salary



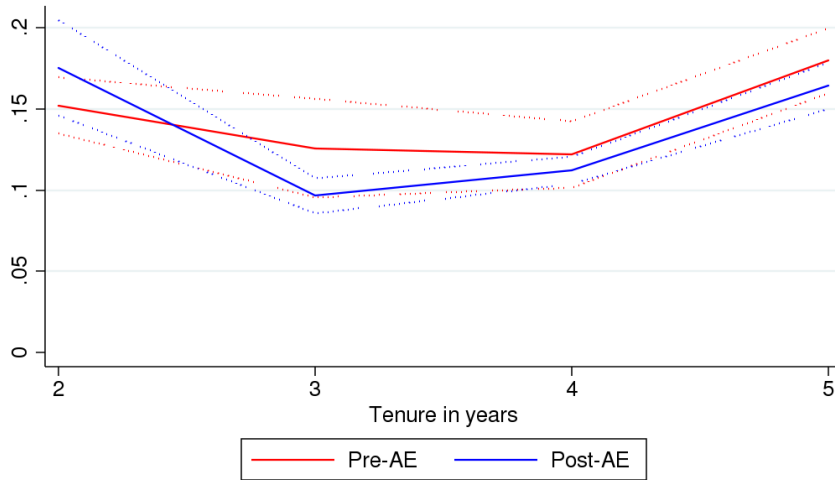
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15D. 4th Salary Quartile Employee Outstanding Loan Balances /Starting Salary



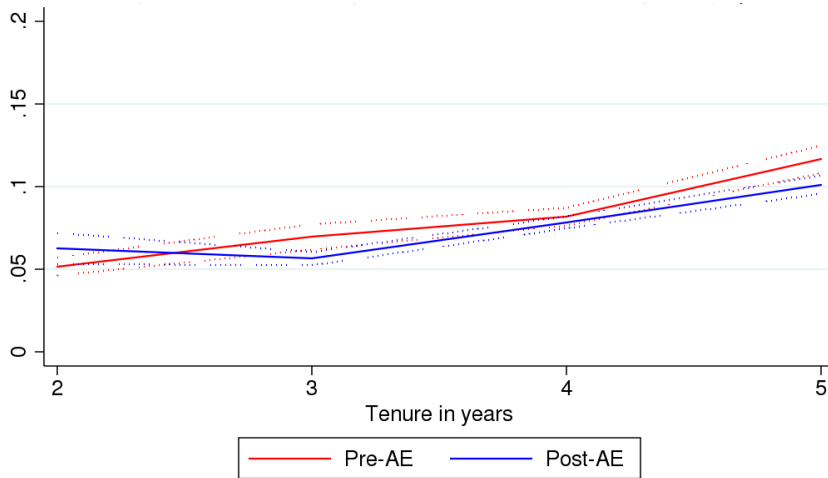
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15E. 1st Salary Quartile Employee with Loan Outstanding Loan Balances/Starting Salary



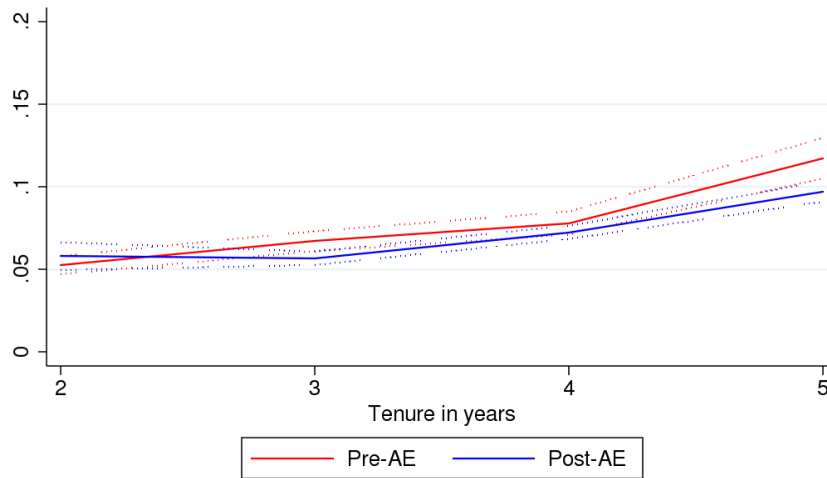
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 15F. 2nd Salary Quartile Employee with Loan Outstanding Loan Balances/Starting Salary



Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

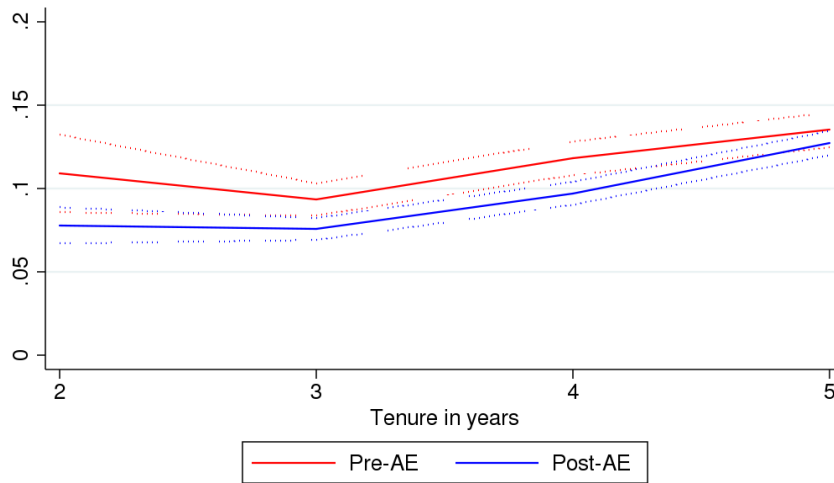
Figure 15G. 3rd Salary Quartile Employee with Loan Outstanding Loan Balances/Starting Salary



Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

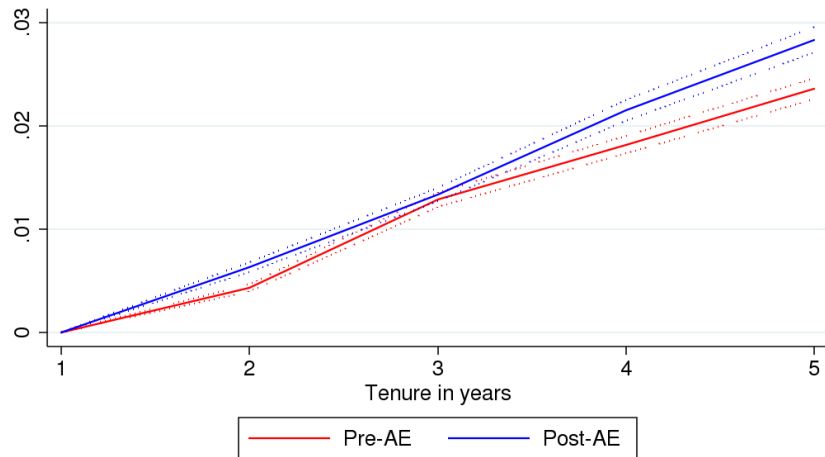
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Figure 15H. 4th Salary Quartile Employee with Loan Outstanding Loan Balances/Starting Salary



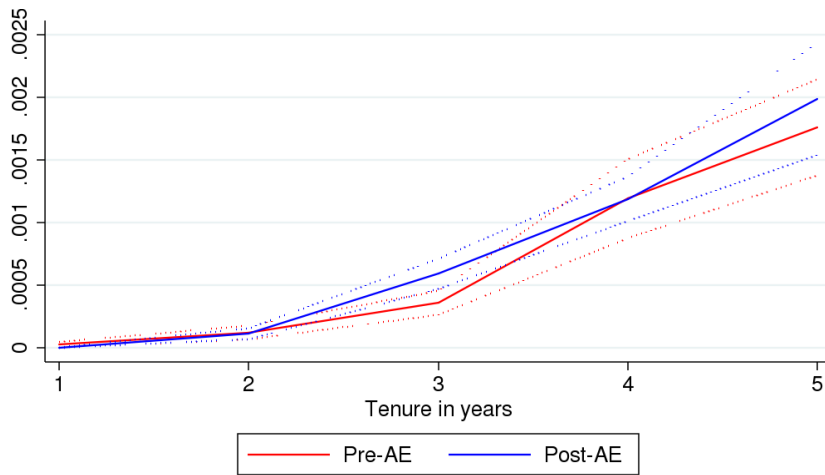
Outstanding loan balance is the sum of loan principal as of year-end. Includes only those employed as of year-end. Quartile cutoffs are determined by pooling deflated starting salaries of both cohorts together. Salaries are deflated to 2004 dollars using growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 16A. Initial Hire Cumulative Roll-outs/Starting Salary



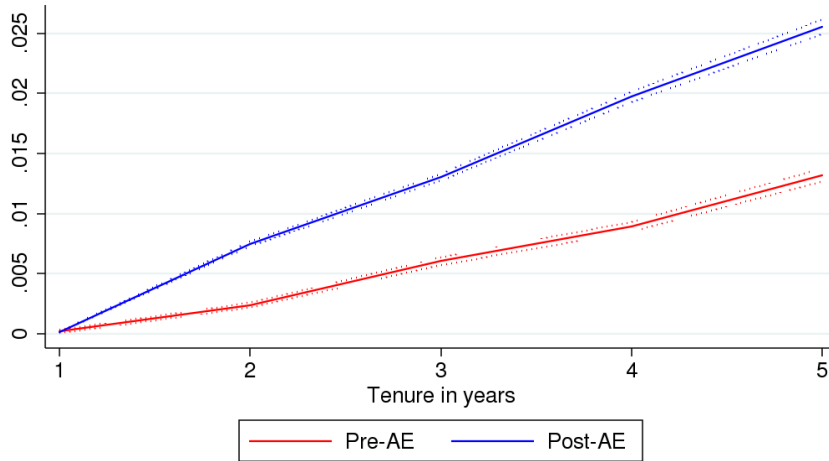
Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 16B. Employee Cumulative Roll-outs/Starting Salary



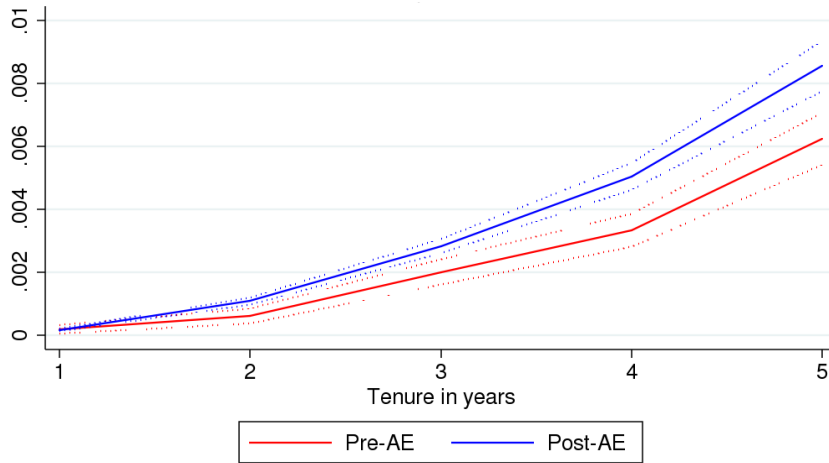
Roll-outs include balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 17A. Initial Hire Cumulative Distributions/Starting Salary



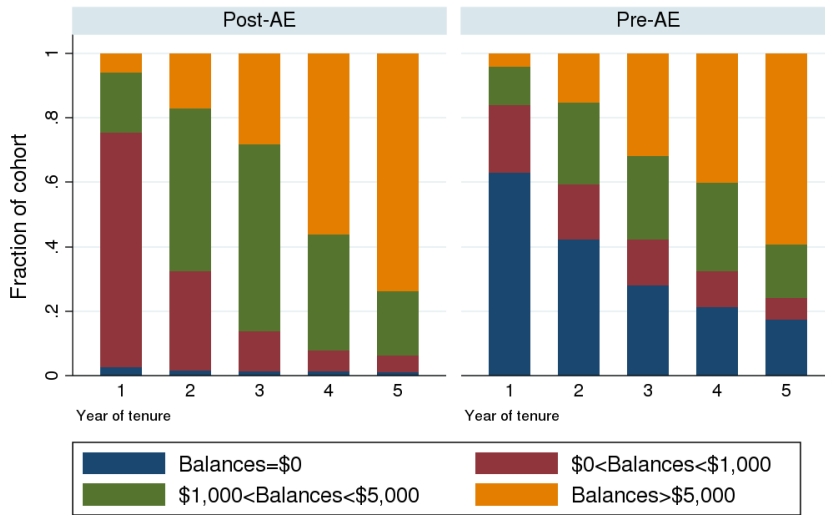
Distributions include withdrawn balances not rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes all initial hires. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 17B. Employee Cumulative Distributions/Starting Salary



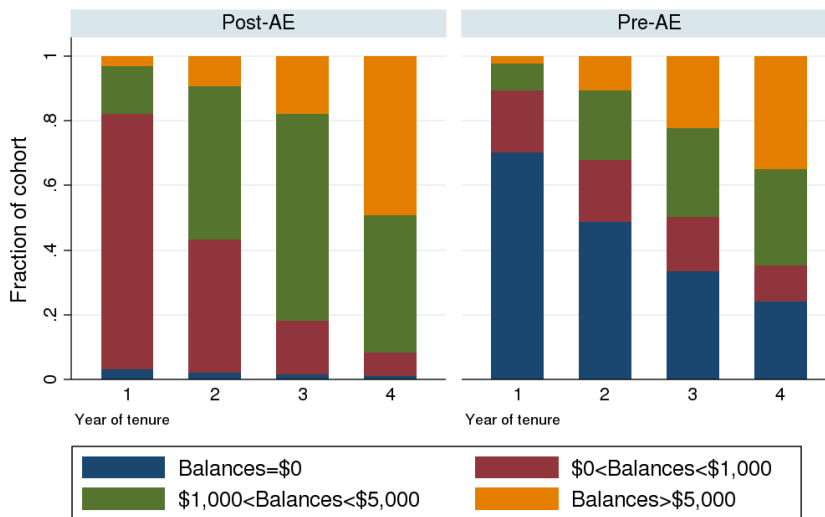
Distributions include withdrawn balances rolled over to an IRA, 403(b), 457, or other qualified plans and are assumed to grow with the S&P 500. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 18. Employee End of Year 401(k) Balances



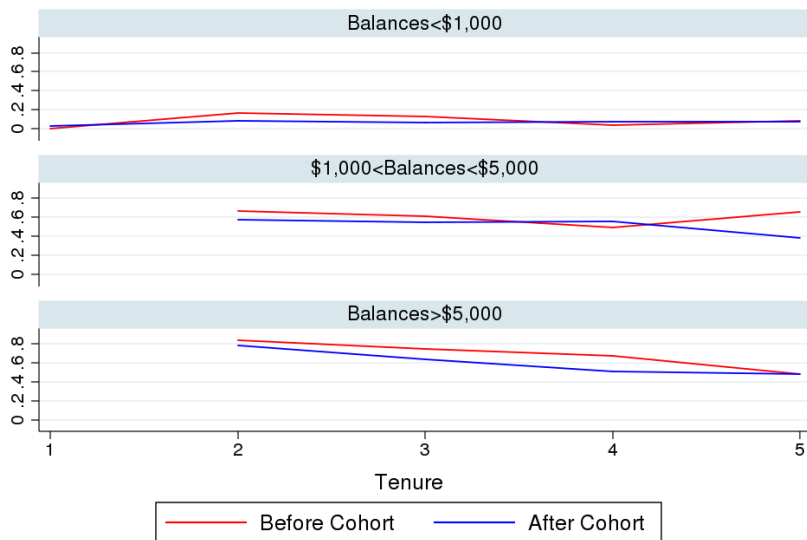
401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those employed as of year-end. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 19. End of Year 401(k) Balances in Year Preceding Termination



401(k) balances include before-tax, after-tax, Roth, employer match, and other accounts rolled into the plan. Includes only those terminated in that year of tenure. Dotted lines indicate plus/minus 1 standard error of mean.

Figure 20. Fraction of Total Distribution Rolled Over



Rollovers include balances rolled over to an IRA, 403(b), 457, or other qualified plans.