Can Knowledge Empower Women to Save More for Retirement?

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Introduction

Even though they live longer and therefore face higher costs during retirement, women save less for retirement. Women start at a disadvantage for wealth accumulation because of lower earnings and labor supply over their lifetimes (GAO 2007). This study focuses on a large public workforce where women also save a lower percent of their incomes and take on lower-return investments. A potential explanation for these gaps is that women have lower levels of financial literacy and engagement in household financial decisions (Lusardi and Mitchell 2008).

Financial literacy and engagement could be improved at relatively low cost, relative to changing lifetime earnings, labor supply, or health. Financial literacy cannot be shared among household members or passed on to survivors, making it all the more important for women who will spend long periods of retirement single. In general, financial education often has no effect on behavior, but a recent study showed that workplace financial education increased budgeting and saving, particularly among women (Collins and Urban 2016). This study examines the effects of an intervention targeted specifically to increase women's retirement savings through information and motivation.

In 2015, several state agencies in Wisconsin implemented a multi-media education effort called Embracing and Promoting Options for Women to Enhance Retirement (EMPOWER). We use monthly longitudinal data for a workforce of 31,000 employees for four years surrounding the program's implementation to detect divergence in the gender gap in retirement savings caused by EMPOWER. To isolate the effect of the program, we employ a triple-difference strategy comparing men to women, before and after implementation, at agencies that implemented the program versus others.

To our knowledge, this is the first study to employ large-scale administrative data on the retirement accounts of public-sector employees. Evidence on public-sector retirement savings has to date been based on household surveys that do not separate primary public retirement plans from supplementary deferred-compensation plans, an important savings instrument for public-sector workers. The EMPOWER program operated with very low marginal costs, and is likely to be portable to other contexts. Our empirical strategy has a strong claim to estimating causal effects of EMPOWER, conditioning out differences across agencies in both levels and trends of retirement savings.

We find that workplace financial education and peer-to-peer motivation increase retirement savings in this context. These workers are required to contribute to a pension fund, but 47 percent also participate in a deferred-compensation savings instrument similar to a 401(k), with the median participant contributing 1.6 percent of earnings each month. EMPOWER increased participation by 2.6 percentage points, closing the gender gap in participation by more than half. We subject this result to several robustness checks, and pre-existing trends explain some of the closing in the gender gap at EMPOWER agencies. There is not clear evidence that workers already participating contributed more of their incomes.

The remainder of the paper expands on the background, setting, empirical strategy, results, and overall conclusions.

Gender Gaps in Retirement Savings

Women face a different set of problems at the end of life than men do (Papke, Walker, and Dworsky 2008). Women tend to live longer than men, which means that they may need to have more set aside for their retirement years, and they may be facing those years alone. Accumulating savings is more difficult since women earn less than men at the same jobs, choose lower paying jobs, are more likely to work part-time, and take more time off of work to care for children and elders (Goldin 2014; Munnell 2004). In many contexts women also take less financial risk, and therefore earn lower returns on investments (Sundén and Surette 1998; Bajtelsmit, Bernasek, and Jianakoplos 1999; Bajtelsmit and Jianakoplos 2000; Dwyer, Gilkeson, and List 2002; Charness and Gneezy 2012).[1] To overcome all of these disadvantages, women must contribute a larger percentage of their earnings toward retirement savings. Hindering this process are higher expenditures on healthcare and student loan payments (Dieleman et al. 2016; AAUW 2017).

Recent evidence shows that women's savings are catching up. Using data from the March Current Population Survey (CPS), Copeland (2014) measured the percent of wage and salary workers ages 21 to 64 who participated in an employer-based retirement plan. The gap between men and women closed from 10.3 percentage points in 1987 to 0.5 percentage points in 2013. More recent administrative data on millions of private-sector workers eligible for defined-contribution workplace plans show women are 7 percentage points *more* likely to save, and save

[1] Other studies find no difference by gender, including Papke (1998) and Papke (2003).

0.4 percentage points *more* of their earnings (Young 2015; Fidelity Investments 2017). One factor helping close the gender gap and raise rates of participation overall is auto-enrollment in savings (Young 2015).

The remaining gaps in participation between men and women were largest among public-sector workers (Copeland 2014). In the public sector, workplace plans are much more commonly offered (82 percent versus 51 percent) and are much more likely to be mandatory defined-benefit plans (Munnell et al. 2011; Copeland 2014). This implies that the remaining gap in participation between men and women arises from differential participation in elective plans, such as in states where optional defined-contribution programs are the primary plan, or where workers participate in supplemental deferred-compensation plans. The survey data available in both the CPS and the Survey of Consumer Finances do not clearly separate these two public-sector options for saving in deferred-compensation plans. In Wisconsin, nearly half of the public workforce participates in deferred compensation, above and beyond required contributions to their pensions. Auto-enrollment in these supplemental savings seems unlikely in the presence of required pension contributions, meaning supplemental saving decisions are left up to workers.

Deciding to save is clearly positively correlated with financial knowledge (Fernandes, Lynch, and Netemeyer 2014; Lusardi and Mitchell 2014). Therefore gender gaps in saving may be exacerbated by gaps in knowledge and motivation. Evidence from a special 2004 supplement to the Health and Retirement Study (HRS) shows that women nearing retirement have low levels of financial literacy and are unlikely to have planned for retirement at all (Lusardi and Mitchell 2008). Similar results are found in the National Financial Capability Study (Bucher-Koenen 2016).[2]

The consequences of lower saving, and the role of information in increasing savings, are less clear (Munnell, Rutledge, and Webb 2014). Using a life-cycle model of financial behavior, most Americans' levels of saving do not appear too low to support consumption during retirement (Scholz, Seshadri, and Khitatrakun 2006; Gale, Scholz, and Seshadri 2009). However, the results of some interventions call into question whether households are actually choosing lower levels of saving. Auto-enrollment in retirement plans should not change behavior if households are optimizing, but auto-enrollment does increase savings (Beshears et al.

[2] In a more detailed but smaller-scale survey, self-assessments of financial preparedness were similar between men and women (Prudential Research 2015).

2009). At the same time, interventions intended to increase financial literacy in general have little to no effect on behavior (Fernandes, Lynch, and Netemeyer 2014).

Evidence on the power of workplace financial education in particular is somewhat more promising (Lusardi and Mitchell 2007). Studying workplace financial education that was delivered to men and women, Clark et al. (2006) found women were more likely to plan to increase contributions, while Collins and Urban (2016) found women actually do increase contributions at higher rates. Other notable studies of workplace financial education find no difference in impacts for men and women, or do not examine gender differences but find impacts could be largest for those who save the least (Bernheim and Garrett 2003; Duflo and Saez 2003). Lusardi and Mitchell (2008) call for educational programs that are long-term, and specifically address women's preferences and saving needs, but to our knowledge no such program has been directly evaluated until now.

Efforts to Close Gender Gaps in Wisconsin

Wisconsin State Workers

The Wisconsin state workforce is employed at a variety of central and statewide employers. This study focuses on 20 of the largest non-school employers. The Department of Employee Trust Funds provided administrative data for all retirement system eligible employees in each month from April 2013 through April 2017. The data include personal characteristics, yearly labor supply and earnings, and monthly participation in retirement accounts.

Table 1 displays characteristics of these state agencies in March 2015 before the implementation of the EMPOWER financial education program. The agencies are grouped based on whether they participated in EMPOWER, and then sorted by employee size.

The agencies are diverse in terms of size, wages, and demographics, but there are no systematic differences between the EMPOWER group and comparison agencies. Employee size varies from a low of 120 to seven organizations with more than 1,000 employees. Median wages overall are $23.39 per hour. While the workforce is balanced between men and women overall, the gender breakdown varies widely by agency, with women comprising over two thirds of health- and education-related agencies Health Services, Veterans' Affairs, Children and Families, and the Public Instruction. Two of the largest employers, Corrections and Natural Resources, are majority men. Overall there is a correlation of negative 0.24 between median wage and percent

women across employers, but the relationship is not monotonic. The median age is 45 with a median tenure on the job of 12 years, with slight variations by agency.

Table 1. Wisconsin state agencies

Agency	Employees	Median wage ($)	Women (%)	Median age	Median tenure (yrs.)
Overall	30,580	23.39	50.1	45	12
EMPOWER-participating					
Health Services	5,830	21.38	65.1	45	9
Transportation	3,340	26.95	38.2	46	14
Administration	920	32.22	39.6	51	14
Agriculture, Trade, Cons. Protection	600	24.54	47.2	47	11
Military Affairs	440	18.65	29.2	49	8
Employee Trust Funds	250	28.49	58.5	49	10
Insurance	140	30.36	52.1	52	14
Housing and Econ. Development	140	32.78	60.8	50	13
Financial Institutions	120	29.60	51.6	48	11
Non-participating					
Corrections	9,550	21.93	42.0	44	13
Natural Resources	2,750	26.06	35.0	46	14
Workforce Development	1,610	21.38	64.6	47	10
Veterans' Affairs	1,320	17.29	79.8	46	6
Revenue	1,050	26.38	52.5	49	13
Children and Families	730	25.23	78.6	44	8
Public Instruction	650	28.38	66.5	47	13
Justice	620	29.38	57.2	42	12
Safety and Professional Services	200	26.28	51.5	51	13
Investment Board	160	71.54	41.1	44	8
Public Service Commission	150	32.98	49.0	50	16

Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees as of March 2015.

The state of Wisconsin offers two main retirement savings programs for its employees, in addition to Social Security: the Wisconsin Retirement System (WRS) and Wisconsin Deferred Compensation (WDC).

WRS is a mandatory pension program with defined-benefit and defined-contribution elements (http://etf.wi.gov/publications/et8901.pdf). In 2017 workers contribute 6.6% of before-

tax income with a full employer match. Additional non-matched contributions are optional. By default, all contributions are invested in a "fully diversified, balanced" Core Fund with mostly equities, but workers can elect to invest half of their contributions in a Variable Fund with greater risk. Retirees are entitled to a benefit which is the higher of two formula-based calculations, one based on the three highest years of earnings and the other based on the balance of employee and employer contributions. Our data include an indicator for participation in the Variable Fund, and a yearly overall balance, but we cannot identify when workers provide additional non-matched contributions.

In addition to the WRS, WDC provides the opportunity for supplemental savings under Section 457 of the Internal Revenue Code (http://etf.wi.gov/publications/et8904.pdf). Workers can make either pre-tax or post-tax (Roth) contributions of up to $18,000 per year, with additional "catch-up" amounts for workers over 50. Participants can invest contributions across 6 target date funds and 16 options in the core investment spectrum, as well as thousands of mutual fund choices through a self-directed brokerage option. Retirement benefits can be received as a lump-sum or annuity. Our data include monthly deferrals and balances to pre- and post-tax WDC plans.

As a governmental 457 plan, the WDC is similar to a 401(k) for a private-sector worker, but is more flexible. First, 457 balances can be withdrawn before retirement with no penalty (though taxes must be paid at withdrawal of pre-tax accounts). Second, 457 contributions are not coordinated with 401(k) contributions, meaning 401(k) contributions by the worker or spouse do not count toward the yearly limit.

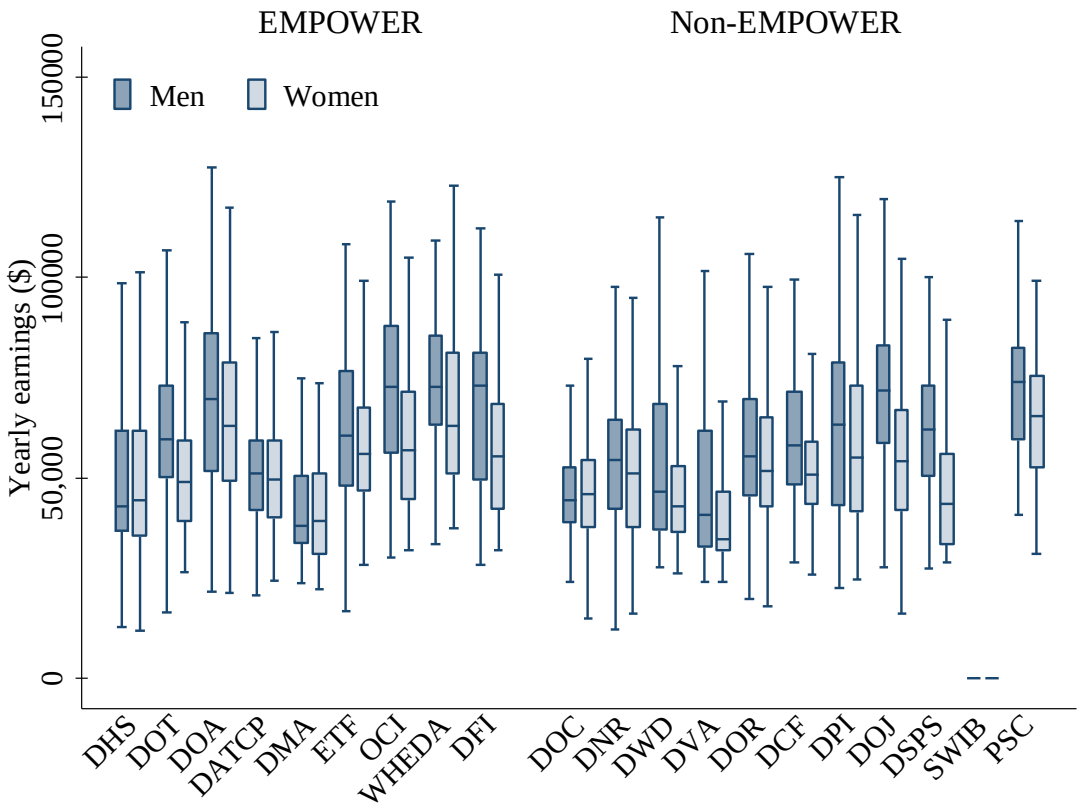
Gender Gaps at Wisconsin State Agencies

Wisconsin bears out several of the overall trends noted in prior research: women earn less, are less likely to take on investment risk, are less likely to participate in retirement savings, and save lower percentages of income when they do participate. The gender gaps persist after controlling for observable characteristics.

At nearly every agency, the median man earns more than the median woman. Figure 1 shows box plots of yearly earnings by agency. The agencies are grouped as in Table 1, by participation in EMPOWER and then sorted by employee size. Earnings are calculated based on employee average hourly earnings over the study period, and scaled to a full-time full year of

work for each employee. The box spans the interquartile range with a line at the median. The whiskers extend to the adjacent values, which are the minimum and maximum observations, that are still within 1.5 interquartile range lengths outside the interquartile range. The plots display workers employed in March 2015, and are also divided by gender within each agency. In most cases each quantile for men is higher than each quantile for women at the same agency. The graph excludes the State of Wisconsin Investment Board, which has much higher earnings than other agencies and also has a large gender gap.

Figure 1. Men earn more



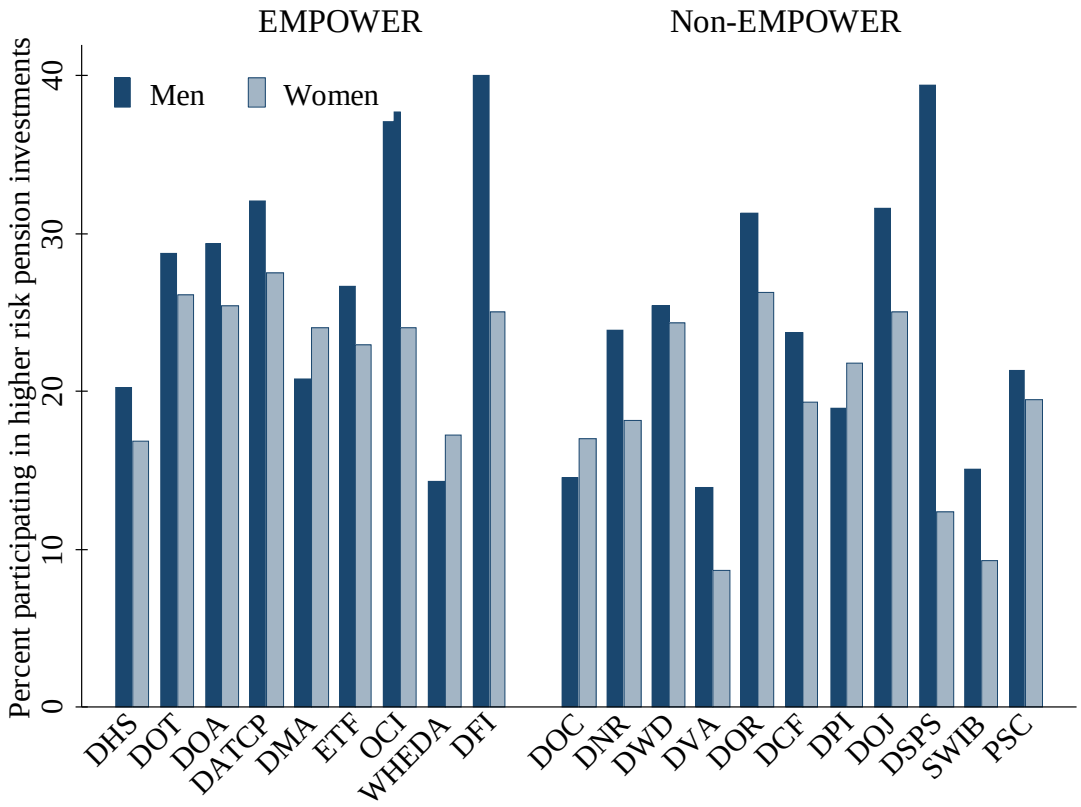
Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees as of March 2015.

The gender wage gap is not completely explained by observables. In raw averages, women earn $4,640 less for a full-time full year, or 91.6 cents on the dollar compared to the average earnings among men. After controlling for individual age, tenure, employer, marital

status, race, and part-time status in a regression, the estimated effect of gender is $4,210, implying women earn 92.4 cents on the dollar. Additional relevant characteristics such as education are not observed in these data.

Men take more investment risk. Figure 2 shows percent participation in the WRS Variable Fund for investing pension balances. The gender gap is present at nearly all agencies. Overall, women are 2.3 percentage points less likely to participate, at 19.0 percent compared to a 21.3 percent participation among men. After regression controls (as described above) this difference falls to 1.4 percentage points.

Figure 2. Men take more investment risk



Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees as of March 2015.

Men are more likely to participate in WDC, and contribute higher amounts when they do participate. Gender gaps in WDC savings are shown in more detail, including trends over time,

in the triple difference analysis below. These gaps provided the motivation for the EMPOWER financial education and motivation program.

Embracing and Promoting Options for Women to Enhance Retirement (EMPOWER)

Wisconsin Employee Trust Funds administers the state pension fund as well as defined-contribution plans for state employees, and became aware of gender gaps in retirement contributions. They set about researching causes and potential solutions in collaboration with researchers from the University of Wisconsin-Madison (Holden and Kock 2012). The result of this effort was the development of EMPOWER program.

The EMPOWER program was presented to representatives of each agency at meetings of Affirmative Action Committee chairs. These committees are tasked with looking for and remedying inequalities by race/ethnicity, gender, age, and other personal characteristics. Each individual representative had the discretion to decide whether employees at their agency could benefit from EMPOWER. We show below that agencies taking up EMPOWER did have larger gender gaps in retirement savings on average. However our triple-difference approach controls for level differences in gender gaps, and is only threatened by changes in gender gaps that are co-timed with EMPOWER.

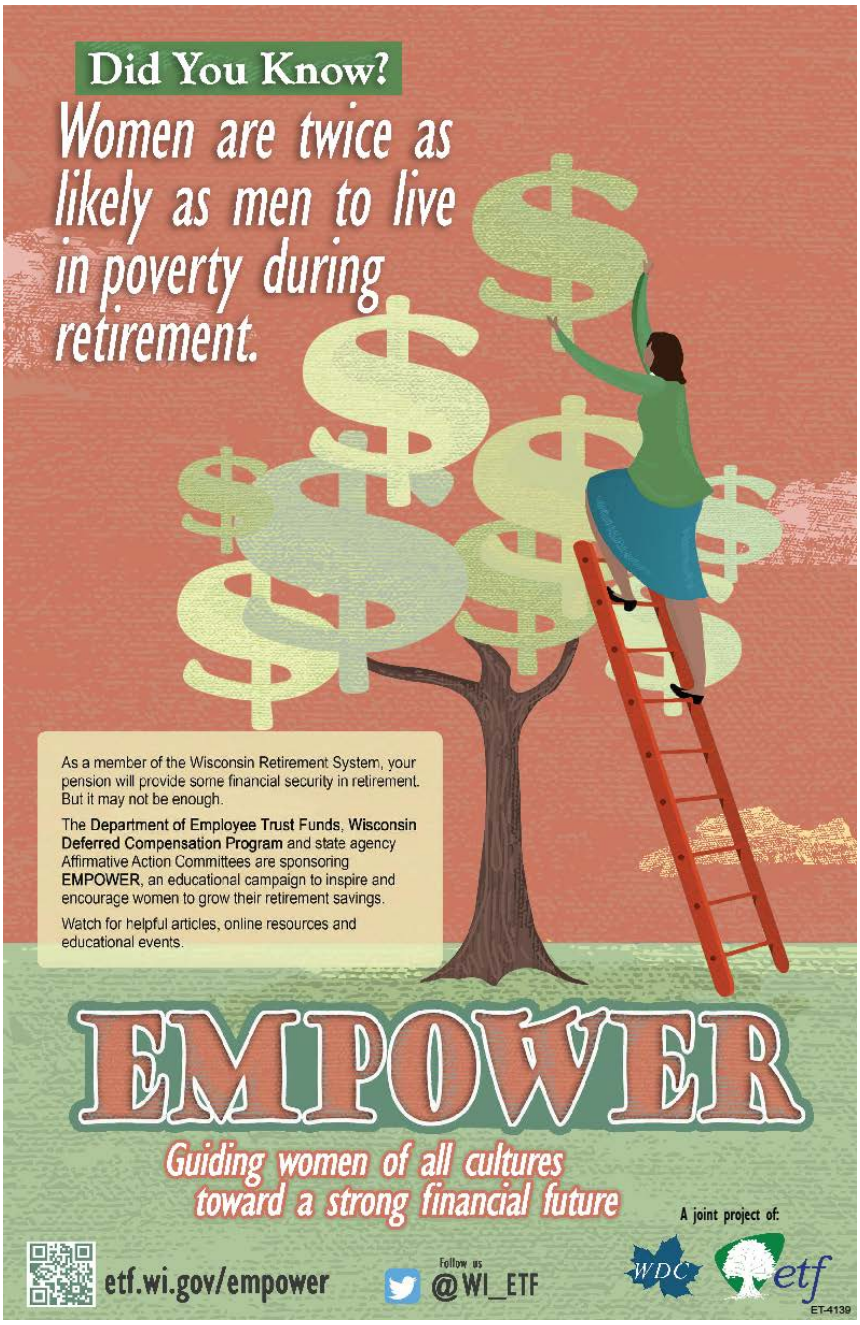
At employers where EMPOWER was chosen for implementation, monthly checklists were created, committing the employer to undertake communications and events in each month for an eight-month span. For all participating employers, implementation began in April 2015.

EMPOWER delivers facts, motivation, and challenges to participations through multiple media over the span of a few months. Each agency had a representative assigned to send short weekly emails with links to website and videos, post posters and literature around the office, field questions from employees about EMPOWER, and to coordinate events. The central events were hosted during lunch at work. They were well attended, even though no incentive or meal was provided. Figure 3 and Figure 4 provide some examples of EMPOWER educational materials.

Fidelity of implementation varied across agencies. Wisconsin Employee Trust funds collected data on EMPOWER activities at each participating agency, but activity reporting also varied in consistency. In summary, about half were considered to have fully implemented

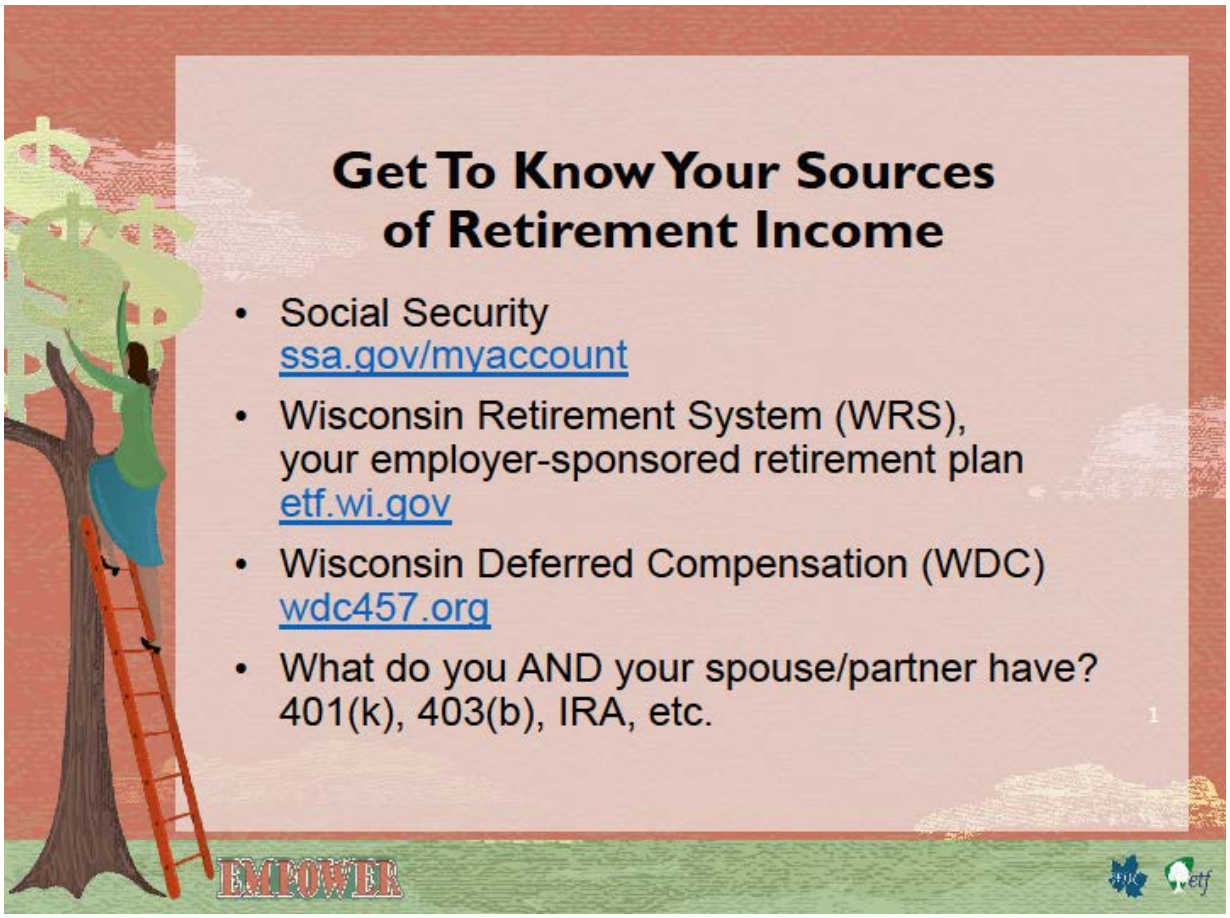
EMPOWER, while others partially implemented it and/or supplemented assigned activities with their own measures.

Figure 3. Promotional poster



Source: Wisconsin Employee Trust Funds.

Figure 4. Example slide from presentation



Source: Wisconsin Employee Trust Funds.

The theory of change of EMPOWER is that peers are an effective medium for information and motivation, especially women talking to other women co-workers. This theory emerged from surveys and focus groups conducted by Holden and Kock (2012). Studies in behavioral finance show people are averse to talking about finances, especially deficits or negative outcomes (Karlsson, Loewenstein, and Seppi 2009). EMPOWER could combat this "ostrich effect" by enforcing the norm that talking about finances is accepted and encouraged. EMPOWER materials pointed out deficits in women's preparation for retirement, but always offered ways to move toward planning and saving.

In response to EMPOWER, households could take several actions. However the most likely, proximate, and a relatively low-risk action is to increase savings in WDC. Since there are tax advantages and no penalties for withdrawal, saving in WDC has a mix of positive features. It

has the flavor of long-term, automated savings endorsed by the workplace, but the flexibility of short-term liquid savings available in emergencies.

The next section discusses our strategy for measuring behavioral responses among EMPOWER's target population.

Estimating the Effects of EMPOWER

The selection and rollout of EMPOWER financial education at the agency level allow for estimation of the causal effect of the program, without the selection bias that would be present if individuals sought out the program themselves. As discussed above, the program was selected by individual community representatives at 9 of the 20 large employers, who then coordinated to begin the program together in April 2015 and to continue it over the following months. The program was directed specifically to women. The key outcomes affected by financial education are participation in WDC, and amount contributed among participants.

We will compare the EMPOWER target population to other workers not exposed to EMPOWER: women employed at other agencies, the same employees before the implementation of the program, and men employed at the same agencies. This triple-difference strategy measures whether the gender gap in savings closed after EMPOWER was introduced, relative to the gap at places where EMPOWER was not introduced. We first present this graphically, then estimate the implied triple-difference effect. We include successive rounds of covariates, trends, and fixed effects to condition out potential confounders. We also look for heterogeneous effects during the post-implementation period and across types of individuals.

The triple-difference can be estimated as a linear combination of eight cell means interacting men/women, before/after, and EMPOWER/never EMPOWER. The following equation produces the exact same estimate, as the coefficient on a triple-interaction term, and allows for the addition of various other terms as controls. Equation (1) models retirement savings choices Y_{it} for individual i in month t employed at agency $E(it)$, as a function of indicators for gender (female F_i), whether the agency ever participated in EMPOWER (treatment $T_{E(it)}$), and whether the month is April 2015 or later (post-implementation P_t).

$$Y_{it} = \rho T_{E(it)} F_i P_t + \eta_1 T_{E(it)} F_i + \eta_2 T_{E(it)} P_t + \eta_3 F_i P_t + \gamma T_{E(it)} + \zeta F_i + \delta P_t + \varepsilon_{it} \qquad (1)$$

The data constitute an unbalanced panel, because workers enter and leave. The workforce in a given month is roughly 31,000, which is stable over the 49-month period of our sample. In each month, about 1 percent of workers enter the workforce and 1 percent leave. We observe a total of 43,363 individuals. The agency $E(it)$ is denoted with a time index because workers can change agencies, though just 2.2 percent of workers ever do.

The outcome Y_{it} is defined in two ways. First, as a binary indicator for participation (the extensive margin). A value of $Y_{it} = 1$ means the worker is currently making either pre- or post-tax deferrals to WDC. Workers commonly move in and out of WDC participation while employed. Of the workers who ever participate in WDC, 13.5 percent will stop deferrals at least once while still employed.

Second, Y_{it} is defined as the total dollars contributed in pre- or post-tax deferrals, as a percent of monthly earnings (the intensive margin). Monthly earnings are calculated for each individual as a weighted average monthly wage, because hours and earnings data are only available at a yearly frequency. When a worker is not contributing, $Y_{it} = 0$. To focus on the intensive margin of increased contributions, we exclude from this analysis any worker who never participated WDC during the period before EMPOWER was implemented (53 percent of the sample).

In both cases, ρ captures the effect of EMPOWER if there is no correlation between the error term ε_{it} and the triple-interaction term. This assumption will hold if there are no omitted factors affecting participation or contributions to retirement savings, that are also coincident with the timing, gender targeting, and agency targeting of EMPOWER. We know of no other policies implemented with the same timing and targeting. Further, we do not expect that selection into EMPOWER by Affirmative Action Committee representatives was a result of pre-existing emphasis on closing gender gaps. Even without policies emphasizing savings, it is possible that EMPOWER agencies were following differential trends in gender gaps versus non-EMPOWER agencies. Differential trends extending into the post-implementation period would introduce bias into estimates of ρ.

Our data provide the ability to look for trends in the pre-implementation period that might suggest differential trends in gender gaps in the absence of EMPOWER. We can also explicitly condition out trends in the regression.

Some other improvements on Equation (1) include controlling for additional person-level variables such as marital status, age, and race/ethnicity. We go a step further and use the panel structure of the data to include person fixed effects, controlling for anything about individuals that is time-invariant.

In regression estimates we cluster standard errors by agency, which is the level of the policy change (Moulton 1986; Bertrand, Duflo, and Mullanaithan 2004). There are 20 agencies, but over 1.4 million person-month observations. Clustering therefore tends to increase standard errors greatly.

The interpretation of each estimated effect is shaped by sampling and specification, but also by the overall circumstances of the intervention. EMPOWER is implemented at the agency level and is optional to workers. Because the information provided is readily available online, the effects of EMPOWER operate through motivation and empowerment, and making information salient. We do not have individual-specific measures of exposure to the financial education, knowledge gained, or increased motivation. However, the agency-wide estimates of changes in saving behavior are still useful to decision makers considering implementing financial education. Wherever it is costly and infeasible to *require* education, the "intent to treat" effect of *offering* education is most relevant.

The coefficient ρ is an average across all types of workers. Our data also allow for testing of heterogeneous effects by individual characteristics of workers or agencies. In particular, we explore whether EMPOWER has a greater effect on younger workers (below 50), and on married versus unmarried workers. To do so we break up the sample and estimate regressions separately for each group.

Effects of EMPOWER

This section reports results starting from a comparison of means and proceeding through various regression adjustments. In each setting we report effects on participation and contribution outcomes.

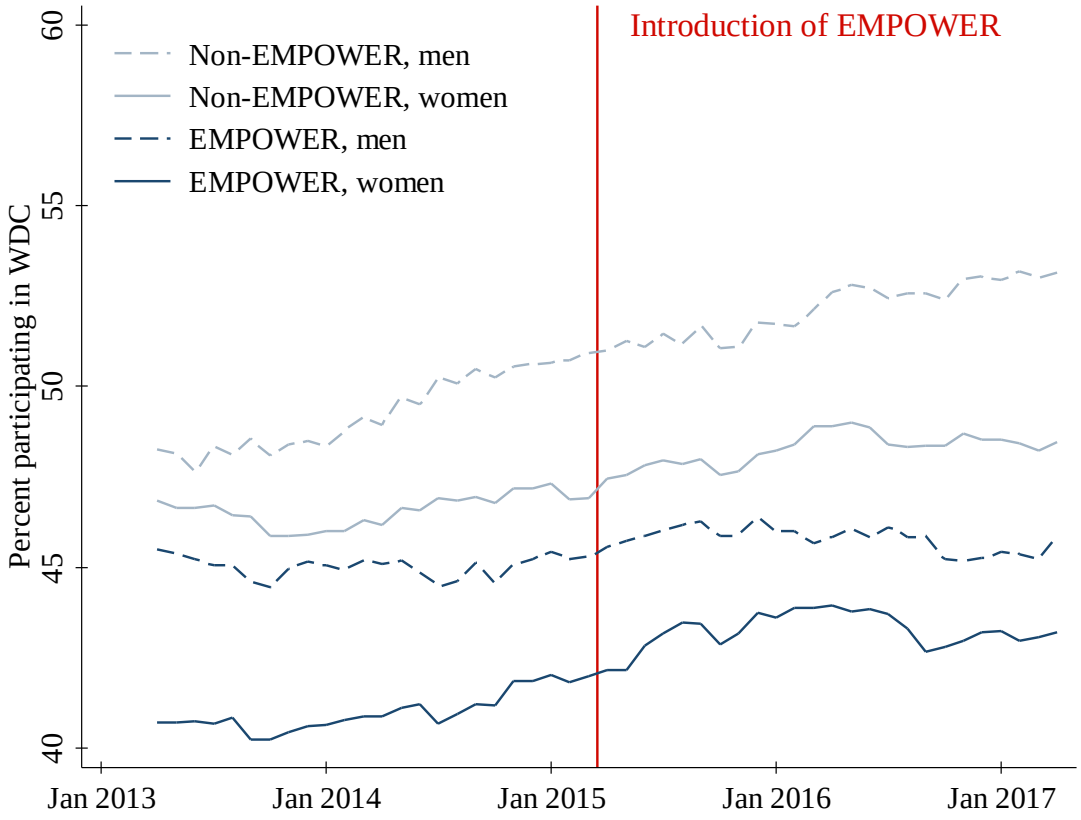
Graphical Results

Figure 5 shows our empirical strategy graphically. The figure tracks the progression of gender gaps in retirement savings at agencies that implemented EMPOWER, versus agencies

that never implemented EMPOWER. In both groups of agencies, men are more likely to participate than women. EMPOWER agencies have a larger initial gender gap, and lower rates of participation overall. Controlling for all of these level differences, we look for divergence in the gender gap after implementation of EMPOWER. The small rise in the "EMPOWER, women" line after implementation, relative to the other three lines, suggests a positive effect of the program.

There is some suggestion of pre-implementation trends that differ across groups of agencies. Genders at the EMPOWER agencies appear to converge slightly while the opposite happens and non-EMPOWER agencies. Absent any effect of EMPOWER, continuing these trends into the post period could lead to an estimated positive effect. Therefore controlling for trends will be important in the regression analysis.

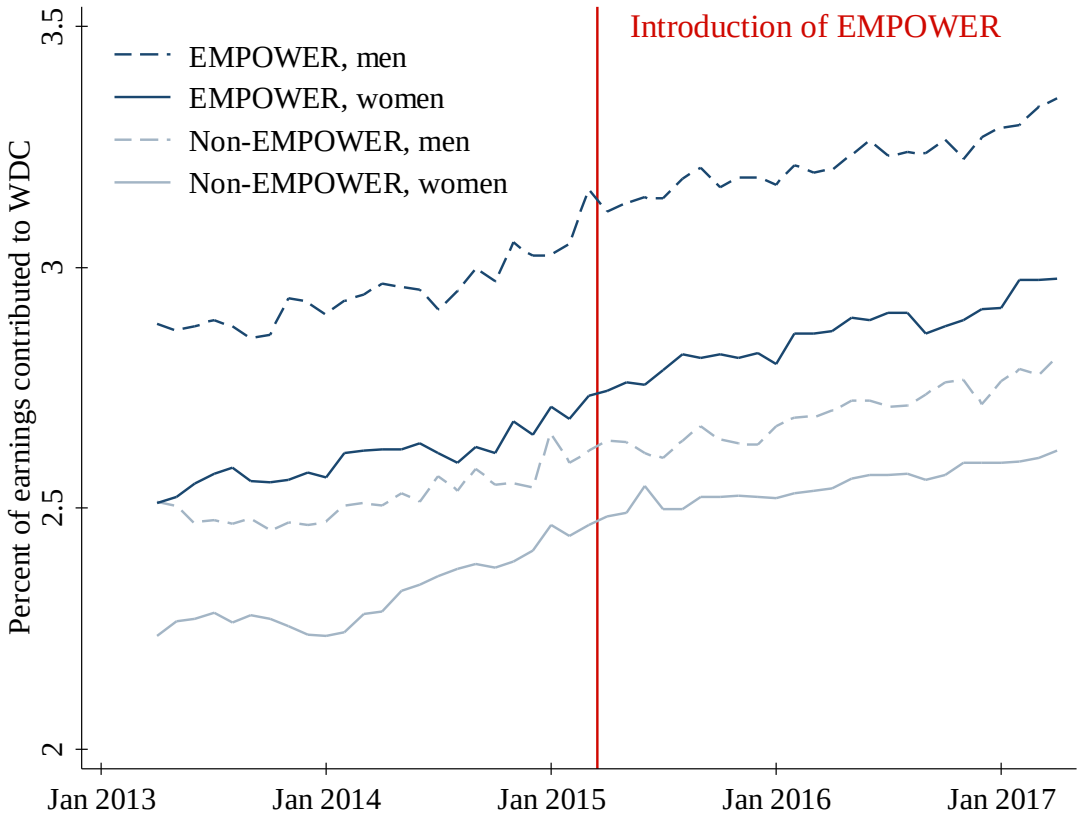
Figure 5. Extensive margin effects of EMPOWER



Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees at 20 central agencies.

Figure 6 does not suggest an effect on contributions. For contributions, women lag behind men in both groups of agencies, but the EMPOWER group contributes more on average for both genders.

Figure 6. Intensive margin effects of EMPOWER



Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees at 20 central agencies, who participated in WDC before April 2015.

Triple-Difference Estimates

Table 2 averages together all months in the pre-implementation and post-implementation periods for each gender, resulting in eight cell means. Table 2 unpacks the composition of the effect by each difference. Reading the differences, men and women in both groups of agencies increased rates of participation. The differences in differences (DD) by EMPOWER group show men's participation increased at higher rates at non-EMPOWER agencies, while women's participation increased at higher rates at EMPOWER agencies. The triple-difference uses the

non-EMPOWER group as a counterfactual, and thus assumes women would have lost ground were it not for EMPOWER. The triple-difference effect is therefore larger than the difference-in-difference effect at EMPOWER agencies.

Table 2. Differences in differences in percent participation in WDC

	Non-EMPOWER			EMPOWER			
	Pre	Post	Diff.	Pre	Post	Diff.	DD
Men	49.3	52.1	2.8	45.0	45.8	0.8	-2.0
Women	46.6	48.3	1.7	41.0	43.2	2.2	0.5
DD			–1.1			1.4	
DDD							2.5

Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees at 20 central agencies over April 2013 through April 2017. DD: difference in difference. DDD: triple-difference.

Table 3 follows the same structure for contributions as a percent of earnings, among workers who participated in the pre-implementation period. All four groups increased contributions on average. However the difference in difference is lower for women than men, leading to a negative triple-difference estimate.

Table 3. Differences in differences in contributions to WDC

	Non-EMPOWER			EMPOWER			
	Pre	Post	Diff.	Pre	Post	Diff.	DD
Men	2.52	2.70	0.18	2.95	3.22	0.27	0.09
Women	2.32	2.55	0.23	2.61	2.86	0.25	0.02
DD			0.05			-0.02	
DDD							-0.07

Source: Wisconsin Employee Trust Funds. Includes all Wisconsin Retirement System eligible employees at 20 central agencies over April 2013 through April 2017. Restricted to participants in WDC before April 2015. DD: difference in difference. DDD: triple-difference.

Regression Adjustments

The above analysis operates using group means, without accounting for the composition of each group in terms of personal characteristics, and does not report standard errors that

account for serial correlation within groups. This subsection presents regression-adjusted results, which support the conclusion of a small positive effect on participation with no apparent effect on contributions among participants.

Results appear in Table 4. Each line only reports the coefficient (estimate and standard error) of the interaction term representing the effect of EMPOWER. Each line successively adds terms. The first line simply adds standard errors to the estimated triple-differences from the prior tables. The participation result is statistically significant at the 5 percent level. An increase in participation of 2.6 closes the gender gap at EMPOWER agencies by about two thirds.

Second, we add person covariates and more flexible controls for agency and month. The conclusions are unchanged. Third, we add agency-specific linear time trends. Now the estimated positive effect on participation is smaller and no longer statistically significant. A 1.4 percentage-point increase still closes a large fraction of 4.0 percentage-point the pre-implementation gender gap at EMPOWER agencies. However the estimate in this specification is not quite as precise.

Table 4. Regression estimates

	Participation (%)		Contributions (% of earnings)	
Specification	Coeff.	(SE)	Coeff.	(SE)
Equation (1)	2.64	(1.05) **	–0.027	(0.055)
+ Person covariates, agency FE, month FE	2.45	(1.01) **	-0.041	(0.050)
+ Agency linear time trends	1.43	(1.12)	-0.036	(0.056)
+ Person FE (excluding agency switchers)	0.09	(0.34)	-0.063	(0.034) *
All of the above, men only (DD)	0.67	(0.25) **	0.038	(0.026)
All of the above, women only (DD)	1.06	(0.31) ***	0.020	(0.008) **

Source: Wisconsin Employee Trust Funds. Standard errors clustered at agency level. Rows with person fixed effects exclude 2.2 percent of sample who change employers. FE: fixed effects.
* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

The fourth line adds person fixed effects. To focus on the within-person impact of EMPOWER, we leave out the small fraction of workers who change agencies during the panel. This ensures that the most significant temporal change will be exposure to EMPOWER. The within-person estimates show no impact of EMPOWER on participation, and a negative impact on contributions. To unpack this result we separately estimate the regression for men and women. This amounts to a difference-in-difference within each gender. In both cases there are

positive and statistically significant effects among women. The lack of a triple-difference effect can be explained by an apparent positive effect for men as well. Spillovers to men are of course possible with discussions between employees.

The difference-in-difference effects on participation for men somewhat surprisingly have different signs in the raw means versus the trend-adjusted, within-person regression. The raw means suggest that workers at EMPOWER agencies lost ground relative to non-EMPOWER peers. This relationship apparently reverses relative to agency trends. We conclude that controlling for trends is important in this context.

Heterogeneous Effects

The final set of analyses concerns heterogeneous effects by individual characteristics. Undertaking each of the analyses above in separate subgroups, there is not strong evidence for differences by personal characteristics. Effects appear somewhat larger for younger workers, defined here as those under 50. This makes sense, because workers nearing retirement have higher saving rates and are less likely to be moved by financial education. Effects do not appear to differ strongly based on marital status, but may be greater for married workers. Full results for these and other heterogeneity analyses are available by request from the authors.

Discussion and Conclusion

This study examined a targeted intervention to increase retirement savings among women. Because of the program's implementation, and access to panel data on participants, we are able to investigate the effects of the program, in the context of recent trends among a diverse population of 31,000 workers. EMPOWER appears to increase retirement savings, but results are somewhat dependent on the context and method of estimation. The effect on participation, but not retirement contributions, is consistent with EMPOWER making workers aware of the option to use deferred compensation but not motivating knowledgeable savers to contribute more.

Our results provide an important contribution to research on financial education for retirement savings. The sample size, frequency, and accuracy of our data are rare in this literature, allowing us to capture with relative precision the effects of EMPOWER on WDC

savings. However, we lack the ability to measure expected Social Security benefits of these workers, retirement accounts of spouses, or other household finances that may be affected.

Researchers have come to conflicting conclusions about whether current rates of retirement savings constitute a crisis, and whether information and encouragement should matter (Munnell, Rutledge, and Webb 2014). Our study, showing positive but somewhat fragile effects of financial education, is consistent with households lacking information and encouragement, but it does not settle the debate on the adequacy of savings rates.

EMPOWER is easily portable to other contexts at low cost, since it works by making general, publicly available information salient through peer-to-peer engagement. EMPOWER consists of several activities, and because they are delivered together we cannot identify which among them has the greatest impact on financial knowledge, motivation, and saving behavior. More research is needed to understand all the causes of gender gaps in saving, and the extent to which financial education can help.

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