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## **23|2019** Do informational nudges alter firms' hiring behavior of older workers?

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# Do informational nudges alter firms' hiring behavior of older workers?

Pia Homrighausen (IAB), Julia Lang (IAB)

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## Abstract

This paper analyses a local marketing campaign in Germany that provided information about unproven age-related stereotypes and the value of older workers. The campaign was designed to increase the hiring rate of older workers. Using comprehensive register data, we find that the information provided by the campaign (via banners, interviews, job fairs and information brochures) did change firms' employment behavior. The cheap and mild intervention increased the employment rate of older workers on average by 3 percentage points. This increase, however, is attributable to an increase in job stability rather than to an increase in the hiring of older workers.

## Zusammenfassung

Die Studie analysiert eine Informationskampagne, die zum Ziel hatte, die Vorbehalte von Firmen gegenüber Arbeitnehmern abzubauen und die Bereitschaft, ältere Arbeitslose einzustellen, zu erhöhen. Unsere Ergebnisse auf Basis umfangreicher administrativer Daten zeigen, dass die Informationskampagne, welche u.a. Plakate, Experteninterviews, Informationsbroschüren und Jobmessen zum Thema beinhaltete, die Beschäftigungsrate älterer Arbeitnehmer im Durchschnitt um etwa drei Prozentpunkte erhöhte. Der Anstieg in der Beschäftigungsrate Älterer scheint jedoch weniger bedingt durch einen Anstieg der Einstellungsquote, sondern vielmehr durch eine stabilere Beschäftigung älterer Arbeitnehmer.

## JEL classification

D83, J21, J23, J64, J78

## Keywords

Difference-in-differences, Information, Nudge, Older workers, Stereotypes, Unemployment

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# 1 Introduction

Demographic changes are one of the key challenges for many countries' labor forces. A shrinking workforce and an impending shortage of skilled labor are issues that have been the focus of political attention. Governments have different strategies to address this problem. In addition to encouraging skilled immigration, policy makers have tried to mobilize inactive workers or reintegrate unemployed workers, especially older unemployed workers.

Even though the employment rate of older workers in many countries has increased in recent years, unemployed age 50 and older still face severe problems in reentering the labor market (OECD 2017). In Germany, the unemployment rate of workers age 50 to 64 has steadily decreased from 8.8 in 2010 to 5.7 percent in 2018 but still exceeds the federal average (Statistics of the Federal Employment Agency, own calculation). Older unemployed are not the first to be fired but are the last to be hired. Compared to younger workers, workers above age 50 face a high risk of long-term unemployment. Only approximately one third of older workers with professional experience who lost their job between 2010 and 2012 found a new regular job within the next three years (Homrighausen and Wolf 2018).

Different policy programs aim to increase the reemployment chances of older workers. Programs targeted at the labor supply side typically provide wage support to lower older workers' reservation wages (e.g., van den Berg et al. 2017) or train older workers to update their skills or become self-employed (Picchino 2015; van den Berg et al. 2017). Programs targeted at the demand side typically offer employer hiring subsidies to give incentives to overcome firms' preferences of hiring younger workers. Indeed, not only in Germany, a worker's progressing age often operates as a great barrier to employment (e.g., Rich 2014; Farber et al. 2017; Neumark et al. 2017). Hiring subsidies, however, do not seem to overcome these barriers (e.g., Boockmann et al. 2012).

Although they often suffer from clear empirical evidence, many age-related negative stereotypes fuel firms' uncertainty about older workers' overall productivity. Among others, older workers are supposed to be less motivated, less flexible, and less adaptable and have lower ambition to be trained (see e.g., Potshuma and Campion 2009; Klehe et al. 2012). Moreover, firms offering specific training and using delayed compensation schemes still prefer younger workers (e.g., Heywood et al. 2010). Due to an expected longer time horizon of younger workers in the firm, they are more likely to be hired independent of their potentially higher job mobility, and even if new current retirement regulations procure a longer employment horizon of younger older workers than probably realized by firms. Driven by these age-related stereotypes and expectations, firms' skepticism about older workers might even prevent them from choosing the optimal hiring candidate from the whole pool of applicants. Therefore, overcoming firms' skepticism is not only important for older workers and – especially in the context of the demographic change – the whole economy but for optimizing firm's hiring decision as well.

The question arises of how to improve firms' decision making with smooth policy intervention. Nudging economic actors towards "better decisions" (cf. Thaler and Sunstein 2008) is receiving increasingly more political attention. In this context, a growing part of the literature shows that informational nudges are efficient at altering behavior in a cheap and gentle way. Providing information can be used to remove information deficits, simplify complex procedures and processes,

or push information to the attention of the beholder. So far, informational nudging has been implemented in the context of various attempts to change individuals' behavior. For example, information was used to affect schooling decisions (e.g., Hastings and Weinstein 2008), payment method (Huysentruyt and Lefevere 2010), training take-up (Görlitz and Tamm 2017; van den Berg et al. 2018), job search behavior (Altmann et al. 2018; van den Berg et al. 2017) and choices about retirement plans or retirement age (e.g., Duflo and Saez 2003; Liebman and Luttmer 2015). Information turned out to be an efficient way to increase take-up of social benefits as well (e.g., Osborne Daonte et al. 1999; Aizer 2003, 2007; Bhargava and Manoli 2015).

A number of countries such as Australia, Finland, the Netherlands or the UK have carried out government-sponsored information campaigns to fight against ageism by employers in general (OECD 2006). However, little is known about the effectiveness of such campaigns. In this study, we analyze whether information can help to increase the employment rate of older workers. In Germany, a local employment agency implemented a marketing campaign to increase the reemployment chances of older workers. Using various types of media (banners, radio interviews, job fairs and information brochures), this campaign provided information about the lack of empirical evidence on many age-related stereotypes and about the potential value of older experienced workers for a firm. We analyze whether the sum of these informational nudges affects firms' employment behavior and look at the mechanisms behind it. We also conduct subgroup analyses by gender and age group. As the campaign was not implemented all over Germany but restricted to one region, we analyze the employment effects of this program by applying a difference-in-differences approach using comprehensive individual register data of the German Federal Employment Agency (FEA). In so doing, we contribute to the literature in several aspects: First, we focus on two hot topics for policy makers and in the literature – older workers and nudging. Second, we expand previous literature on informational nudging by estimating the effects of information not on individuals' but on firms' behavior, which is quite rare.

Our results show that the marketing campaign indeed succeeded in changing firms' behavior. The cheap and smooth policy intervention increased the employment rate of older workers on average by 3 percentage points. This effect is comparable to other studies using informational nudges and quite high given the smooth intervention. The increase in the employment rate of older workers, however, is the result of a decrease in separations rather than an increase in the recruitment of older workers. Our results are robust to several kinds of sensitivity checks and do not vary substantially by the gender or age of the older workers.

The paper is organized as follows. Section 2 describes the marketing campaign in detail, followed by the empirical strategy in Section 3. The data used as well as the descriptive results are shown in Section 4. Section 5 presents the empirical results, and Section 6 concludes the paper.

## 2 The marketing campaign for older workers

In April 2011, the German local employment agency in Potsdam implemented a marketing campaign for unemployed workers age 50 and older called “*Juwel Berufserfahrung*” (analogues “*Jewel Professional Experience*”). The aim of the campaign was to increase the hiring rate of older workers

by fighting against unproven negative age-related stereotypes and raise firms' attention about the high potential of older workers, especially their professional experience. The target group of the program was older unemployed relatively closely attached to the labor market.<sup>1</sup> Detailed information about the fact that many age-related stereotypes lack empirical evidence and information about the advantages of recruiting a professional older worker were supposed to diminish discriminatory attitudes of firms towards older workers.

At the beginning of the campaign, the local employment agency awarded a prize to five firms located in Potsdam and its environs serving as role models in the context of hiring older workers. During a public event organized by the employment agency and attended by the local press, these firms received a trophy that looked like a large jewel. This jewel – a polished gem – denoted the value of an experienced older worker for a firm. In addition, newly hired older workers of these firms were pictured with a large jewel (see Figure A 1 in the Appendix as an example). After the event, the local employment agency hung these pictures as banners combined with some information about the workers, their skills and the value of older workers in general in Potsdam and nearby regions, especially in lobbies of business-oriented organizations, such as the Chamber of Industry and Commerce.

In the following months, the local employment agency aimed to increase the awareness of the campaign among regional firms. To do so, the program and its content were introduced in the regional daily and newspapers to which regional firms typically subscribed. In addition, the head of the local employment agency and the managers of the winning firms gave interviews about the campaign and the difficulties older unemployed workers face concerning negative age-related stereotypes. Moreover, the local employment agency launched job fairs with a focus on older workers to help overcome firms' prejudices. Parallel to banners and advertisements in newspapers, the agency sent information brochures introducing the campaign and the benefits of hiring older workers to firms located in Potsdam and nearby. As a final step, the caseworkers handed information brochures to older unemployed workers that presented arguments against negative stereotypes towards older workers in their job interviews.

The main part of the campaign took place in the year 2011. Since the campaign was only locally implemented and not part of a federal active labor market policy program, the design and implementation of the marketing campaign was completely carried out by the local employment agency in Potsdam. The local employment agency spent approximately 6,200 Euros (without personnel expenses) to launch the campaign in 2011. At the beginning and the end of the following year, the employment agency relaunched parts of the campaign. The agency used banners, information brochures and advertisements in newspapers to keep the value of older workers in firms' minds<sup>2</sup>. For the relaunch, the local employment agency spent another 1,300 Euros (without personnel expenses). Thus, the marketing campaign was a very cheap policy intervention.

The marketing campaign was supposed to raise firms' attention about the high potential of older workers and to overcome firms' prejudices about older workers' low productivity to increase their

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<sup>1</sup> Germany also implemented the program "Perspective 50plus", a program carried out almost all across the country for the different target group of older long-term and hard-to-place unemployed. The main part of the program entailed intensified counseling and coaching of older workers by caseworkers (Boockmann and Brändle 2018).

<sup>2</sup> There was another small relaunch of the campaign at the end of 2013 and 2014 using digital media instead of print media. The public employment agency linked short videos showing interviews with the workers of the winning firms in 2011 on its homepage. However, only employers looking at the employment agency's homepage could see the videos.



hiring rate. There are two possible mechanisms through which the marketing campaign could have changed firms' behavior: by increasing the hiring rate and by increasing the job stability of already employed older workers. Firms might renew older workers' employment contracts or desist from dismissing older workers. Given the low program costs, any marginal raise in the employment rate of older workers c.p. would have result in an efficient effect of the marketing campaign. Nonetheless, a program fighting against age-related stereotypes and emphasizing the value of older workers might also raise employers' awareness on the special needs of this target group (see e.g., Coate and Loury 1993). A marketing campaign especially about older workers, thus, might also fail to eliminate age-related stereotypes or even worsen them. In the worst case, the campaign would result in a lower hiring rate of older workers or an increase in older workers' job loss. The net effect of the campaign on the employment rate of older workers, therefore, was unclear.

### 3 Empirical strategy

We take advantage of the locally restricted implementation of the program by employing a standard difference-in-differences (DD) approach. We compare the difference in the average outcome in the treatment group before and after the campaign was implemented to the difference in the average outcome in a control group and focus on the core period of the campaign from April 2011 to December 2012. Using monthly data from January 2009 to December 2012, we observe workers in the treated and control districts 27 months before the implementation of the campaign and during the campaign.

Our treatment group is workers age 50 and older who were unemployed and seeking a job in the treated employment agency district of Potsdam at least once during our observation period. Older workers of other local employment agency districts were not affected by the campaign and serve as a control group. We also restrict the control group to workers with at least one unemployment episode in the observation period.

$Y$  is our outcome referring to whether an older worker is employed in a regular job ( $Y = 1$ ), or not ( $Y = 0$ ).  $\bar{Y}_0$  is the mean outcome before the implementation of the campaign and  $\bar{Y}_1$  is the mean outcome after the implementation, C denotes the control group and T the treatment group. The DD of the average treatment effect can be described as follows:

$$\hat{\delta}_{DD} = (\bar{Y}_1^T - \bar{Y}_0^T) - (\bar{Y}_1^C - \bar{Y}_0^C) \quad (1)$$

The identifying assumption of the DD estimator is that the expected change in outcomes for the control group is the same as it would have been for the treatment group in the absence of the treatment, i.e., the campaign. Our choice of comparison group (described in Section 4) relies on assuming that older unemployed in the chosen non-treated local employment agency districts were not affected by other programs or campaigns implemented to increase older workers' reemployment chances. We believe this assumption is reasonable, as the records of the German FEA did not contain any other program applied in the selected control districts for this target group during the observation period or throughout Germany.

We estimate the treatment effect  $\delta_1$  from the following regression model, adjusting standard errors for clustering by individual worker:

$$Y_{ijt} = \alpha_0 + \alpha_1 T_{ijt} + \delta_0 POST_t + \delta_1 POST_t T_{ijt} + \beta X_{ijt} + \mu_j + \theta_t + \varepsilon_{it} \quad (2)$$

where index  $i$  denotes individual  $i = 1, \dots, n$  in employment agency  $j$  in month  $t = -27, \dots, 21$ .  $T_{it}$  is a dummy variable that equals one for individuals in the treated employment agency district in month  $t$ .  $POST_t$  is a dummy variable that equals one for periods after the campaign was implemented ( $t = 0$  to  $t = 21$ ) and zero otherwise. Moreover, we include agency fixed effects  $\mu_j$  and time fixed effects  $\theta_t$ .  $X_{ijt}$  is a vector of individual and labor market characteristics, and  $\varepsilon_{it}$  is the random error term. For the main results, we estimate (2) using ordinary least squares (OLS).

## 4 Data and descriptive statistics

For this study, we use the Integrated Employment Biographies (IEB) of the German FEA, which provide comprehensive information about all employed and unemployed workers in Germany. In addition to sociodemographic characteristics, IEB data contain information about workers' employment history (excluding self-employment and civil service), unemployment and active labor market programs on a daily basis (for more information on a sample of the IEB, see e.g., Oberschachtsiek et al. 2009, or Dorner et al. 2010). We use version V12.01 of the IEB and consider up to five years of a worker's employment and unemployment history. Using the IEB data enables us not only to control for a rich set of observables in later analyses but also indirectly to control for unobservables by taking into account the labor market history of our observed workers (Caliendo et al. 2017).

We focus on workers age 50 to 64 who registered as unemployed and job seeking (ue) at least once between 1 January 2009 and 31 December 2012 (the end of the campaign). To focus on unemployed relatively closely attached to the labor market, we exclude unemployed persons who did not receive unemployment benefits but means-tested public welfare benefits. In Germany, unemployed workers in principal receive mean-tested welfare benefits if they are not entitled to unemployment benefits. To be entitled to unemployment benefits, a worker must have been employed for at least one year within the last two years before their first day of unemployment. Older workers age 50 and older are entitled to up to 24 months of unemployment benefits depending on their employment history.<sup>3</sup>

The IEB data also contain information about the employment agency responsible for a registered unemployed worker. The treatment – the marketing campaign “Juwel Berufserfahrung” – was implemented in Potsdam, our treated employment agency district. To identify appropriate control agencies and thus a control group of older workers for our analysis, we use the classification scheme for employment agencies of the FEA. This scheme assigns all 147 German employment agency districts to twelve different so-called “comparison types”. The FEA takes into account regional labor market conditions, such as the regional unemployment rate, the share of commuting people, the share of low-skilled workers, the share of workers in small firms, the number of workers

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<sup>3</sup> Unemployed age 50 to 56 (55 to 57) (58 and older) are entitled to 15 (18) (24) months of unemployment benefits if they were employed at least 30 (36) (48) months in the past five years.

related to the population density and the level of tertiarization (for more information on the regional identifier, see Hirschenauer and Springer 2014). The FEA applies this scheme for monitoring and controlling.

Using this classification scheme, we limit our control group to all older workers registered at least once with one of the four following East German employment agencies, which are the nearest neighbors of our treated employment agency, Potsdam: Erfurt, Frankfurt Oder, Jena, and Magdeburg. These employment agency districts, thus, are the most similar employment agency districts in Germany at that time. Except for the employment agency district Magdeburg, they do not border the district of Potsdam. Thus, we do not have to fear large spillover effects of the campaign. However, if there are any spillover effects of the campaign in Potsdam on the outcomes of the employment agency Magdeburg, this will cause only an underestimation of our results. For our analyses, we exclude workers switching between employment agency districts during their time in unemployment. In addition, we take into account in our analysis that workers might look for a job in nearby regions.

To gain more information about the characteristics of employment agencies not taken into account in the classification scheme as well as the labor market situation an unemployed worker at that time had to deal with, we also use data from the Statistic Service of the FEA as well as of the Federal Statistical Office. Data from the Statistic Service of the FEA offer information on the monthly local unemployment rate of all workers and of workers age 50 and older, the number of local vacancies as well as the number of participants in active labor market policy programs (ALMP) of each local employment agency. In addition to unemployment rates, we use variables for the number of unemployed workers per vacancy and the share of all unemployed and of older unemployed individuals entering ALMP programs (ALMP intensity). ALMP intensity can be used to proxy unobserved employment agency heterogeneity as more motivated employment agencies are more likely to place their unemployed into a program (see e.g., Dauth 2019). In addition, we use information from the Federal Statistical Office, namely, GDP per capita, the population density and variables indicating the population shares of individuals age 30 to 45 and individuals age 50 to 65.

Table 1 shows differences between the treated agency Potsdam and the control agencies in regard to additional information collected by the Statistic Service of the FEA and the Federal Statistical Office. Although we used the classification scheme described above to identify appropriate non-treated control agencies, there are some significant observable differences between the treated employment agency in Potsdam and the untreated employment agency districts. These differences, however, are quite small. For example, in addition to a higher GDP, Potsdam has a slightly lower share of older people compared to the control regions. Moreover, Potsdam has a higher share of unemployed per vacancy. Looking at Table 1, however, other labor market differences do not support that the treatment was implemented in Potsdam due to bad labor market conditions compared to other regions. In fact, the unemployment rate and especially the unemployment rate of older workers is slightly lower in Potsdam. Looking at the treatment intensity variables, Potsdam's caseworkers do not seem to be more motivated in bringing the unemployed back to work. Even though there is a significant difference in the treatment intensity of older workers between Potsdam and the control agencies, this difference again is very small.

**Table 1: Mean values of treated and control employment agencies in the observation window**

	Potsdam	Control agencies	Dif Δ
Annual GDP per capita	35699.200	32109.625	3882.125***
Population density	845.979	809.342	36.637***
Unemployed per vacancy	17.737	12.683	5.055***
Share of population age 30-45	0.220	0.187	0.033***
Share of population age 50-65	0.193	0.201	-0.008***
Unemployment rate	8.538	9.170	-0.633***
Unemployment rate of older workers	10.012	11.649	-1.627***
Treatment intensity	0.042	0.041	0.001***
Treatment intensity of older workers	0.027	0.023	0.004***
N	48	192	

Note: All numbers are shares unless otherwise indicated. \*/\*\*/\*\* indicate significant differences of mean values between the treated employment agency and the non-treated agencies on the 10%/5%/1% level.

Source: Data of the Statistic Service of the Federal Employment Agency. Own calculations.

Straitening the sample to unemployed workers for whom we have no missing information in the sociodemographic characteristics and their employment history, our sample contains approximately 45,000 individuals. Between 1 January 2009 and 31 December 2012, 16,245 older workers were registered as unemployed at least once in the treated employment agency district in Potsdam, and 29,147 older workers were registered in one of the control agencies. In addition, we use a sample of 41,442 unemployed younger workers (19,576 unemployed in Potsdam and 21,866 unemployed in the control agencies) age 30 to 45 to check the robustness of our results.

Table 2 shows mean values of selected covariates of older workers in Potsdam and the control regions at a worker's first day of unemployment during the observation period. We find significant differences in most of the listed variables. Older workers in Potsdam are slightly younger, and the share of men is slightly lower. They more often are married and have non-German nationality. The variables indicating the highest schooling and vocational degree show that the share of individuals without a degree is somewhat higher for older workers in Potsdam. However, their employment histories reveal that older workers in Potsdam seem to have been more successful in the labor market than those from the control agencies. For example, they spent more time in employment and fewer days in unemployment. We have to account for the differences between unemployed in the treated and control regions in our analyses.

**Table 2: Mean values of selected covariates for older workers (at the first day in unemployment during the observation period)**

	Treated	Controls	Dif Δ
Male	0.582	0.597	-0.015***
Age (in years)	55.220	55.967	-0.747***
Age group			
50-54	0.469	0.381	0.088***
55-59	0.357	0.406	-0.049***
60-64	0.174	0.213	-0.039***
Marital status			
Single	0.180	0.211	-0.031***
Not married, cohabiting	0.049	0.058	-0.009***
Single parent	0.014	0.015	-0.001
Married	0.757	0.716	0.040***
Children in household (<15 years old)	0.053	0.068	-0.015***
Foreign nationality (yes=1)	0.013	0.009	0.004***
Highest vocational degree			
No vocational degree	0.042	0.030	0.012***
Vocational degree	0.786	0.804	-0.018***
University degree	0.172	0.166	0.006
Highest schooling degree			
Secondary schooling degree (degree unknown)	0.041	0.045	-0.005**
No secondary schooling degree	0.018	0.015	0.003**
Secondary schooling degree (Hauptschulabschluss)	0.216	0.199	0.016***
Secondary schooling degree (Mittlere Reife)	0.523	0.551	-0.028***
Higher secondary schooling degree	0.203	0.189	0.014***
<b>Employment history</b>			
Tenure last job (days)	1014.668	953.927	60.741***
Last average daily gross wage (Euro)	58.358	54.884	3.473***
1 year before first ue spell			
Days in employment	232.428	216.598	15.831***
Days in unemployment	142.486	160.083	-17.596***
Number of unemployment episodes	1.881	1.949	-0.068***
Cumulated wage (Euro)	13591.760	12155.730	1436.058***
5 years before first ue spell			
Days in employment	1278.381	1218.265	60.116***
Days in unemployment	531.946	629.626	-97.680***
Number of unemployment episodes	4.093	4.661	-0.586***
Cumulated wage (Euro)	76802.340	70209.906	6592.437***
N	16,245	29,147	

Note: All numbers are shares unless otherwise indicated. \*/\*\*/\*\* indicate significant differences of mean values between workers in the treated employment agency and workers in the non-treated agencies on the 10%/5%/1% level.

Source: IEB. Own calculations.

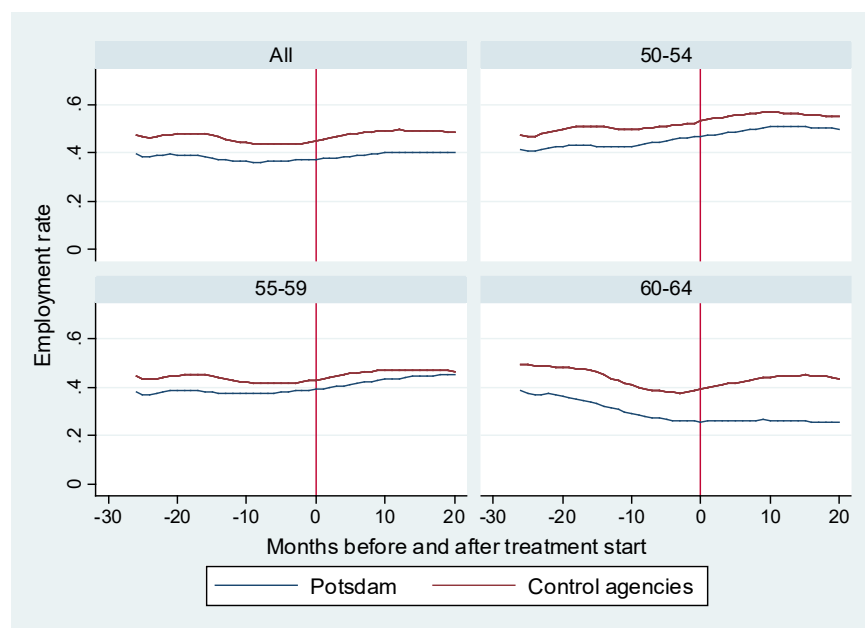
We consider as the main outcome whether a worker is employed. We focus on regular, unsubsidized employment subject to social security contributions. Figure 1 shows the employment rate of older workers in the treated and untreated employment agencies as well as employment rates by

three age groups (age 50 to 54, age 55-59 as well as 60 and older) before and after the implementation of the treatment, the marketing campaign. The red vertical lines in the figure indicate the month  $t = 0$  when the campaign started. For all older workers, the trends of the employment shares before the introduction of the campaign are quite similar in Potsdam and the control agencies (top left in Figure 1). Thus, the common trend assumption seems to hold.<sup>4</sup> The same applies to the trends of the subsamples by age groups (see also Figure 1) as well as by gender (see Figure A 3 in the Appendix).<sup>5</sup> In the next section, we also present the results of several placebo tests that confirm this impression.

Looking at the campaign period, Figure 1 shows a slight increase in the employment rate of older workers in both Potsdam and the controls regions. However, there are no obvious differences in the development of the employment rates. If so, the employment rate of older workers in the control regions seems to have increased more than the employment rate of older workers in Potsdam after the implementation of the marketing campaign.

Looking at the employment rates of workers by age group in Figure 1, however, shows a different picture. The employment rates for workers age 50 to 59 seem to be increasing slightly stronger in Potsdam than in the control agencies after the implementation, whereas the employment rate of workers age 60 and older in Potsdam is quite stable or even decreases during the campaign period compared to the increasing employment rate in the control agencies.

**Figure 1: Employment rates of older workers (seasonally adjusted)**



Source: IEB. Own calculations.

<sup>4</sup> A similar pattern for pre-treatment trends can be found for younger workers (see Figure A 2 in the Appendix). Post-treatment trends show that the employment share of younger workers in Potsdam decreased in comparison to that of younger workers in the control region.

<sup>5</sup> Considering employment by gender, women have a somewhat lower employment rate than men, but the overall pattern is the same as for all older workers (see Figure A 3).

**Table 3: Mean employment rates for subgroups**

		Potsdam			Controls			Dif $\Delta$
		Pre (A)	Post (B)	(B)-(A)	Pre (C)	Post (D)	(D)-(C)	(B)-(A)-[(D)-(C)]
50 to 54	Female	0.426	0.482	0.057	0.491	0.521	0.029	0.027*** (0.005)**
	Male	0.452	0.532	0.081	0.519	0.593	0.074	0.007*** (0.004)**
55 to 59	Female	0.368	0.414	0.046	0.394	0.411	0.018	0.029*** (0.004)**
	Male	0.389	0.474	0.085	0.458	0.513	0.055	0.030*** (0.004)**
60 to 64	Female	0.257	0.213	-0.044	0.397	0.389	-0.008	-0.036*** (0.006)**
	Male	0.299	0.285	-0.014	0.444	0.458	0.014	-0.028*** (0.005)**
All		0.386	0.419	0.032	0.456	0.496	0.040	-0.007*** (0.002)**

Source: IEB. Own calculations.

Table 3 confirms the results of Figure 1. It presents the mean pre- and post-treatment employment rates for all older workers and different subgroups, as well as the raw DD results without controlling for any covariates. The last row of Table 3 shows that the employment share of older workers in Potsdam increased by 3.2 percentage points. The mean employment rate of older workers in the control group, however, increased by 4.0 percentage points. The raw DD, thus, is negative and driven by the DD of workers age 60 and older. Overall, the descriptive results do not clearly indicate that the campaign had an overall impact on the employment chances of older workers. The following section shows whether this result holds using a DD-approach controlling for differences in observables and unobservables.

## 5 Empirical results

### 5.1 Main results

We estimate a linear probability model and present results for ordinary least squares regressions, controlling for covariates on the individual level, as shown in Table 2, as well as for sector, occupation and level of educational requirement in a worker's last job. We also control for the covariates on the employment agency level shown in Table 1. The coefficients  $\delta_1$  of the treatment variable ( $POST_tT_{ijt}$ ) are presented in Table 4. In the baseline model (column (A)), we find that the introduction of the campaign significantly increased the employment share of older regular workers in Potsdam by 3.3 percentage points. This result does not change substantially if we restrict employment to jobs with a tenure of at least three or six months<sup>6</sup>. The same applies if we exclude workers

<sup>6</sup> Results are available on request.

with jobs in employment agency districts other than the agency responsible for their place of residence<sup>7</sup>. As we focus on regular employment, the effect is not driven by marginal or subsidized employment. The results are robust to omitting one of the control agencies at a time (see Table A 1 in the Appendix).

The result of our baseline model is in contrast to the overall negative effect we found in the descriptive analysis. This indicates that there is some kind of negative selection concerning older workers in Potsdam in the post-treatment period. As this negative selection is mainly apparent for workers age 60 and older (see also Table 3), we discuss this in more detail in Section 5.3., where we estimate effects by different age groups.

In addition to the graphical analysis of the plausibility of the common trend assumption (see Figure 1), we also perform several placebo tests using pseudo treatments. Our first placebo test focuses on younger workers age 30 to 45. Younger workers are not the target group of the campaign and therefore should not be positively affected by its implementation. If any, there could be a displacement effect on younger workers, e.g., during the campaign, employers are more likely to hire older instead of younger workers, causing a decrease of younger workers' employment rate. Our results show that younger workers are not affected by the treatment (see column (B) in Table 4).

As a second placebo test, we use different points in time before the campaign was actually introduced as pseudo implementation dates (see column (C) and (D) in Table 4). We consider only the period before the actual implementation and use pseudo treatments for six and twelve months before the campaign started. We do not find any significant effect of these placebo treatments on the employment rate of older workers.

**Table 4: Difference in differences results (DD)**

	(A) Baseline model	(B) Placebo: Younger workers	(C) Placebo: 6 months before	(D) Placebo: 12 months before
Treatment effect	0.033*** (0.004)	0.002 (0.005)	-0.001 (0.004)	0.002 (0.004)
Individual socio-demographic characteristics	+	+	+	+
Individual labour market history	+	+	+	+
Time dummies	+	+	+	+
Regional characteristics	+	+	+	+
N	1,563,463	1,267,847	930,295	930,295

Notes: Regional characteristics include agency dummies. \*/\*\*/\*\* indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

To perform further robustness checks of our results, we also included individual fixed effects to additionally control for unobserved time-invariant individual heterogeneity (see column (A) in Table 5). The treatment effect in the fixed effects model of 0.028 is only slightly lower but still positive and highly significant.

<sup>7</sup> Results are available on request.



Although our previous results do not indicate that the common trends assumption is violated, we additionally include group-specific trends in our model. With this specification, we can control for constant differences in the dynamics between the treatment and control group (Mora and Reggio 2012). The estimated treatment effects with a linear or a quadratic trend are 2.3 and 2.0 percentage points, somewhat lower than the effect in our baseline estimation but still highly significant (see Table 5, column (B) and (C)).

Table 3 shows that workers in Potsdam and the control region differ with respect to the observable covariates. To ensure that we do not compare treated and controls that are not comparable in their characteristics, we use propensity score matching to restrict our sample to similar workers. We match individuals in the treatment and control region at the time of their first unemployment spell in the observation period. We use all covariates on the individual level to predict the propensity scores and perform a one-to-one nearest neighbor matching with replacement. As unemployed workers also differ in regard to whether they lost their job before or during the campaign period, we perform matching not only separately for men and women but also for individuals who experienced their first unemployment spell before and after the implementation of the campaign. For details on the balancing properties, see Table A 2 in the Appendix. The weights obtained by propensity score matching are then used for the weighted DD regressions in Table 5, column (D). The estimated treatment effect of 4.8 percentage points exceeds the effect obtained by our baseline estimation. Thus, if we focus on workers in Potsdam and the control agencies that are more similar in terms of observables, the implementation of the marketing campaign still has a highly significant positive effect on the employment rates of older workers.

**Table 5: Robustness tests (DD)**

	(A) Individual FE	(B) Group-specific linear trend	(C) Group-specific quadratic trend	(D) NN matching
Treatment effect	0.028*** (0.004)	0.023*** (0.005)	0.020*** (0.005)	0.048*** (0.006)
N	1,563,463	1,563,463	1,563,463	846,605
Placebo: Younger workers	0.000 (0.005)	-0.001 (0.005)	-0.001 (0.006)	0.011 (0.007)
Placebo: 6 months before	-0.001 (0.003)	-0.004 (0.004)	0.003 (0.004)	-0.003 (0.005)
Placebo: 12 months before	0.005 (0.004)	-0.001 (0.004)	0.003 (0.004)	0.004 (0.005)

Notes: Control variables include individual socio-demographic characteristics and labor market history, regional characteristics time and agency dummies. \*/\*\*/\*\* indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

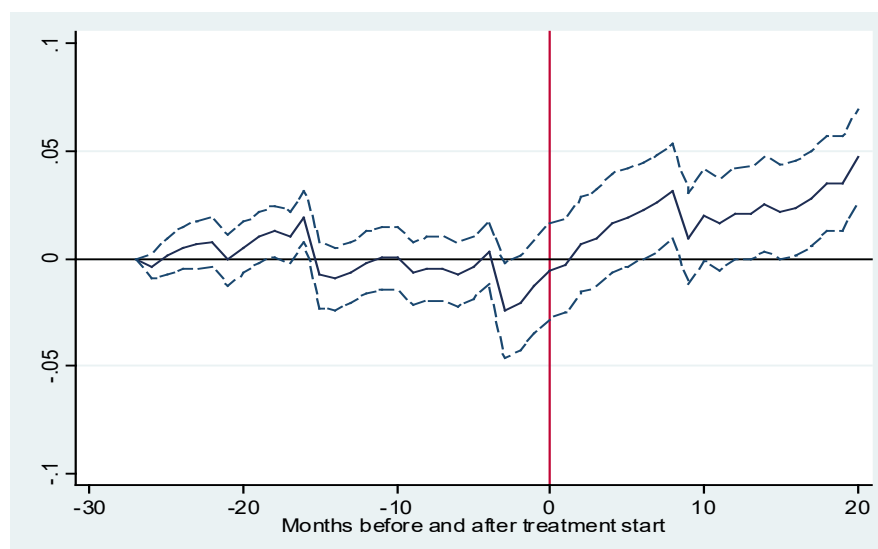
Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

With standard DD estimation, we assume that there is a permanent shift in the outcome variable after the first month the campaign was implemented. As described in Section 2, the campaign consisted of different measures, which were gradually implemented to popularize the campaign in 2011. Moreover, there was a relaunch at the beginning of 2012. Thus, it is not obvious that the effect of the campaign is constant over time. Moreover, it is likely that it takes some time for employers to adjust their behavior, and it takes some time (and administrative work) to hire new workers.

To analyze this in more detail, we use another specification where we apply a fully flexible model (Mora and Reggio 2012) and interact the monthly time dummies with the dummy for the treated region Potsdam (reference category is the interaction of the treatment dummy and the dummy for January 2009, the first month in our observation period). We include these interactions instead of the treatment group dummy  $T$  and its interaction with the  $POST$  dummy, indicating months after the implementation of the campaign.

Figure 2 shows the results of the fully flexible model. Again, the red vertical line indicates the start month  $t = 0$  of the campaign. Looking at Figure 2, we find a seasonal pattern in the effects on the employment rate. Moreover, there seems to be a downward trend before the start of the campaign, but afterwards treatment effects increase over time. There is a slight decrease in the effect at the end of 2011 (8 months after the implementation), which can be attributed to the overall seasonal pattern, but the effect increases again afterwards.

**Figure 2: Flexible DD model**



Notes: Dashed lines indicate 95% confidence interval of the treatment effects.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

## 5.2 Mechanism

Our previous results show that the campaign implemented by the employment agency in Potsdam significantly increased the employment probability of older workers and that these results proved to be robust to using different specifications and placebo tests. The question, however, still arises whether the campaign indeed increased the hiring rate of older workers. The increase in the employment rate of older workers could also have other reasons. Instead of or in addition to increasing the transition rate from unemployment to employment, the campaign could have affected the employment stability of older workers. This means firms might be less likely to terminate older workers' employment contracts or be more likely to renew their fixed-term contracts. To analyze these different mechanisms, we estimate the DD model using transitions from unemployment to employment and vice versa as outcome variables. For estimating effects on the transition from

unemployment to employment, we use a subsample of unemployed workers, whereas for estimating effects on the transition from employment to unemployment, we use a subsample of employed workers.

Table 6 shows the results of the transitions. Columns (A) to (C) show no significant effect on the transitions from unemployment to employment, i.e., the hiring rate of older workers. This result is robust to pseudo treatment time points before the actual start of the campaign. The placebo test on younger workers in the baseline model as well as with linear trend indicate a negative effect on younger workers, which might be due to displacement effects or due to an overall negative trend in transitions to employment in the region of Potsdam. However, this effect becomes insignificant if we match the nearest neighbors.

Columns (D) to (F) show results on transitions from employment to unemployment. The first two columns show a slight but significant decrease from 0.009 to 0.007 in the transition rate. The significant negative effect of the baseline model in column (D) as well as the model with a linear trend in column (E) are robust to placebo tests and increase in size using the matched sample of treated and controls. The decrease in the transition from employment to unemployment increases to 0.023 (column (F)). However, this effect is not robust to a pseudo treatment to younger workers and on earlier time points. Looking at all results of Table 6, an increase in job stability rather than an increase in the hiring rate seems to be the reason for an increase in the employment probability of older workers after the implementation of the campaign. The reduction of transitions from employment to unemployment can be due to an increase of job stability of both already employed and of newly hired workers.

**Table 6: Transition from unemployment to employment and from employment to unemployment (DD)**

	Unemployment to employment			Employment to unemployment		
	(A) Baseline model	(B) Linear trend	(C) NN Matching	(D) Baseline model	(E) Linear trend	(F) NN Matching
Treatment effect	0.002 (0.003)	0.001 (0.003)	0.006 (0.004)	-0.009*** (0.003)	-0.007** (0.003)	-0.023*** (0.004)
N	526,691	526,691	293,223	739,191	739,191	390,904
Placebo younger workers	-0.015*** (0.001)	-0.011** (0.005)	-0.007 (0.006)	0.000 (0.002)	0.002 (0.003)	-0.007** (0.003)
Placebo 6 months before T	0.000 (0.003)	0.002 (0.003)	0.001 (0.004)	-0.004 (0.003)	0.000 (0.004)	-0.003 (0.003)
Placebo 12 months before T	-0.004 (0.003)	-0.004 (0.003)	-0.001 (0.004)	-0.003 (0.003)	-0.002 (0.003)	-0.009** (0.004)

Notes: Control variables include individual socio-demographic characteristics and labor market history, regional characteristics time and agency dummies. FE estimates show similar results. 1:1 NN-matching with replacement. \*/\*\*/\*\*\*/ indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

### 5.3 Effect heterogeneity

The descriptive results in Figure A 3 and Table 3 do not indicate clear differences in the effectiveness of the campaign between men and women. Moreover, the descriptive results suggest that the oldest of the older workers do not benefit from the campaign (see Figure 1 and Table 3). To see

whether these results also hold controlling for covariates affecting the employment chances of older workers, we run the estimations separately for different subgroups.<sup>8</sup>

The results by gender in Table 7 indicate a positive effect of the campaign on the employment rates of both men and women. At first glance, it seems that women benefit more from the campaign than men do. The baseline results indicate that the campaign increased the employment probability of men by 2.2 percentage points and that of women even by 5.2 percentage points. However, the pseudo-treatment coefficient of the placebo test for younger female workers is positive and significant, which might indicate that there was an improvement for all female workers in Potsdam after the implementation of the campaign, not only for older women. Thus, we probably overestimate the treatment effect to some extent. The placebo test on younger male workers shows a significant negative effect, also when including a linear trend. This might indicate a displacement of younger male workers due to the campaign or a negative trend in Potsdam for all male workers (regardless of age). However, the effects are significant only at the 10-percent level and disappear if we match younger workers of Potsdam and the control regions. As the treatment effect for men increases when we use the matched sample where we do not find any negative effects on younger workers, we probably underestimate the true effect for men in the other specifications.

**Table 7: Difference-in-differences results by gender**

	Female			Male		
	Baseline model	Linear trend	NN Matching	Baseline model	Linear trend	NN Matching
Treatment effect	0.052*** (0.007)	0.042*** (0.007)	0.050*** (0.010)	0.022*** (0.006)	0.012* (0.006)	0.045*** (0.008)
N	616,209	616,209	341,040	947,254	947,254	505,565
Placebo test: Younger workers	0.027*** (0.007)	0.021** (0.008)	0.023** (0.010)	-0.012* (0.006)	-0.012* (0.007)	0.001 (0.009)
Placebo treatment 6 months before T	0.003 (0.006)	-0.004 (0.006)	-0.001 (0.007)	-0.002 (0.005)	-0.003 (0.005)	-0.005 (0.006)
Placebo treatment 12 months before T	0.010* (0.006)	0.005 (0.007)	0.001 (0.008)	-0.003 (0.005)	-0.004 (0.006)	0.006 (0.007)

Notes: Control variables include individual socio-demographic characteristics and labor market history, regional characteristics time and agency dummies. FE estimates show similar results. 1:1 NN-matching with replacement. \*/\*\*/\*\* indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

Table 8 shows the estimation results for the three different age groups. If firms have disbeliefs about the productivity of workers age 50 and older, one would expect a lower effect of the marketing campaign for younger older workers as they might suffer less from age-related negative stereotypes. Moreover, compared to workers age 60 and older, they face less incentive to retire early. However, firms might also be more persuaded of older workers value if they were still far away from retirement age, resulting in a higher positive effect of the marketing campaign for younger older workers.

<sup>8</sup> As the estimated effects for different subgroups on the transition variables analyzed above (see section 5.2) do not provide any additional insights, we concentrate on our main outcome regular employment.

For workers age 50 to 59, the multivariate DD results go in the same direction as the raw DD results in Section 5. We find that the campaign increased the employment probability of workers age 50 to 54 by 2.7 percentage points in the baseline model and that of workers age 55 to 59 by 4.0 percentage points. The results after matching or including linear trends are also significantly positive. For the oldest age group, the descriptive results in Figure 1 and Table 3 indicate a decrease in the employment chances of unemployed workers registered in Potsdam. Our multivariate analysis, however, shows that even for the oldest workers in our sample, the campaign increased the employment probability. The effect from the baseline model of 3.5 percentage points even exceeds the treatment effect of the youngest older workers. The pseudo-treatment effects for the oldest workers are significant in some cases but point in a negative direction.

**Table 8: Difference-in-differences results by age group**

	Age 50 to 54			Age 55 to 59			Age 60+		
	Baseline model	Linear trend	NN Matching	Baseline model	Linear trend	NN Matching	Baseline model	Linear trend	NN Matching
Treatment effect	0.027*** (0.004)	0.022*** (0.009)	0.044*** (0.011)	0.040*** (0.007)	0.033*** (0.008)	0.055*** (0.010)	0.035*** (0.008)	0.017* (0.009)	0.055*** (0.012)
N	548,877	548,877	322,759	659,620	659,620	343,483	354,966	354,966	180,363
Placebo treatment 6 months before T	-0.002 (0.006)	-0.007 (0.007)	-0.001 (0.008)	0.005 (0.005)	0.003 (0.006)	0.004 (0.008)	-0.008 (0.006)	-0.002 (0.008)	-0.018** (0.009)
Placebo treatment 12 months before T	0.008 (0.007)	0.007 (0.008)	0.016* (0.009)	0.002 (0.006)	-0.001 (0.007)	0.004 (0.008)	-0.018** (0.007)	-0.016* (0.009)	-0.015 (0.010)

Notes: Control variables include individual socio-demographic characteristics and labor market history, regional characteristics time and agency dummies. FE estimates show similar results. 1:1 NN-matching with replacement. \*/\*\*/\*\* indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

The discrepancy between the descriptive results and the results of the multivariate analysis indicates that workers age 60 and older in Potsdam might have had worse characteristics after the start of the campaign than before, compared to workers age 60 and older in the control regions. This presumption is supported by the numbers in Table A 3, which show the mean values for selected control variables for different age groups before and after the campaign started.<sup>9</sup> For example, workers age 50 to 59 in Potsdam spent one to 10 days less in employment (4 to 13 days more in unemployment) during the last year compared to workers in the control agencies. However, there is hardly any difference before and during the campaign period. In contrast, workers age 60 and older in Potsdam spent 36 days less in employment in the pre-treatment period. This difference increased to 52 days in the campaign period. The difference in days in unemployment also increased from 31 (pre-treatment) to 62 (post-treatment) days. After controlling for this deterioration of labor market performance (and other factors affecting employment), the effect of the campaign is also positive for the oldest workers.

<sup>9</sup> In contrast to Table 2, which shows mean values at the first day of unemployment in the sample (one observation per individual), Table A 3 shows the mean values for all observations. For most of the variables, there is little difference between the values in the two tables, except for the variables reflecting the short-term labor market history. At their first day of unemployment in our sample, older workers in Potsdam spent more time in employment during the last year and less time in unemployment. This result changes when we calculate the mean values over all observations. As in our sample, older workers in Potsdam are more affected by unemployment than those in the control regions (longer or more frequent unemployment episodes), their short-term employment history deteriorates over time.

Overall, it seems that there are no substantial differences in the effects of the campaign based on gender or age. There might be at least differences in the effects of the treatment by educational level or in regard to workers with different occupational levels in their last job. This, however, is also not the case.<sup>10</sup>

## 6 Conclusion

In countries challenged by demographic changes, it is of high political interest to increase the labor force participation of older workers to counteract a decreasing work force and a shortage of skilled labor. Various policy interventions in Germany, such as an increase in the legal retirement age, resulted in a growing employment rate of older workers by decreasing exit from work. However, once unemployed, older job seeking workers still have a comparatively low chance at reentering the labor market. This even applies to older job seekers with a long pre-unemployment tenure who are relatively closely attached to the labor market.

Previous research suggests that informational nudges are cheap and smooth policy interventions for changing economic agents' behavior. In 2011, a German local employment agency implemented a cheap marketing campaign to provide information about unproven age-related stereotypes to open firms' eyes to the value of older experienced workers. Using informational banners, expert interviews and job fairs, firms were informed about their unfounded skepticism. The aim of the campaign was to increase the hiring rate of older workers. Our study evaluates whether and how the sum of informational nudges provided by the campaign indeed managed to alter firms' behavior. We also perform subgroup analyses. We apply a difference-in-differences approach using comprehensive German register data.

Our results show that the marketing campaign – a relatively mild and cheap intervention – increased the employment rate of older workers living in the treated employment agency region on average by 3 percentage points. The effect is based on regular employment and not driven by marginal jobs or subsidized employment. The results are robust to several robustness checks, such as different specifications of the model, and do not vary substantially by gender and age group of older workers; even workers age 60 and older are affected.

Did the campaign increase hires of older workers? Our results show no effect on transitions from unemployment to employment but do imply an increase in the job stability of older workers. Thus, the marketing campaign failed to increase the hiring rate of older workers but gave incentives for firms to change their dismissal behavior. We note, however, that a change in firms' dismissal behavior in the short run might be a first step to changing firms' hiring behavior in the longer run. Overall, in line with most of the previous literature, our results show that an informational nudge is able to change one's behavior. We contribute to the literature by presenting the results of an informational nudge targeted at firms' behavior. Nevertheless, as the information was visible not only to firms but also to the older workers themselves, we cannot rule out that an increase in their self-esteem was also a reason for the increase in older workers' job stability. However, as most of the media used to provide information was targeted towards firms, we expect the largest part of the effect to reflect a change in firms' employment behavior.

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<sup>10</sup> Results are available upon request.

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## Appendix

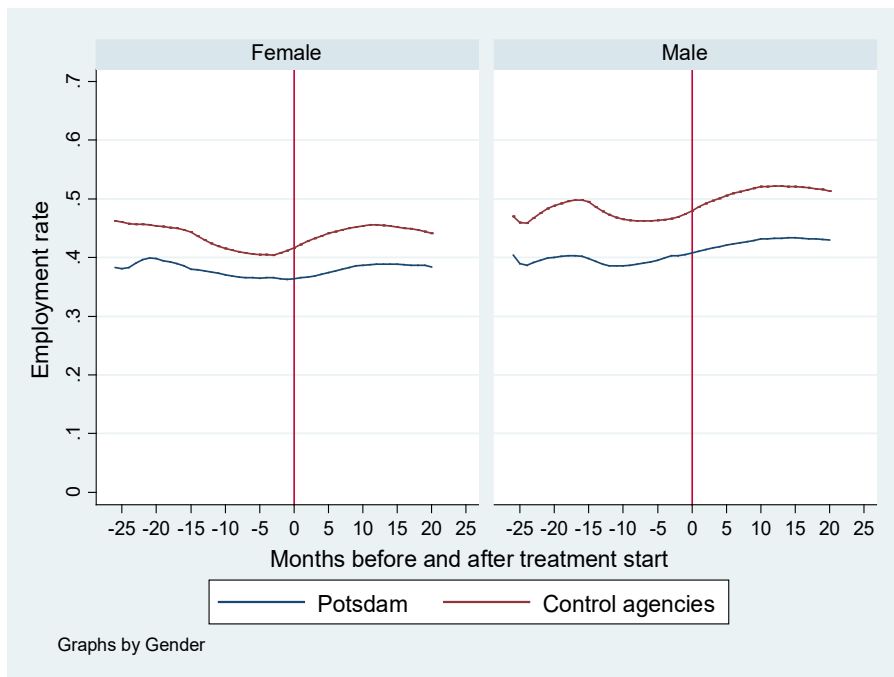
Figure A 1: Picture of an older worker with professional experience (example)



Note: We have to black out information on the picture due to data security reasons. Analogous translation “Every older worker with professional experience is a unique treasure.” (Headline), “Mr. XY has expert knowledge, he is very professional and we appreciate his stoic calm” (employer on the left side), “Workers with professional experience are of great value for each firm. Explore for treasure” (box on the left side).

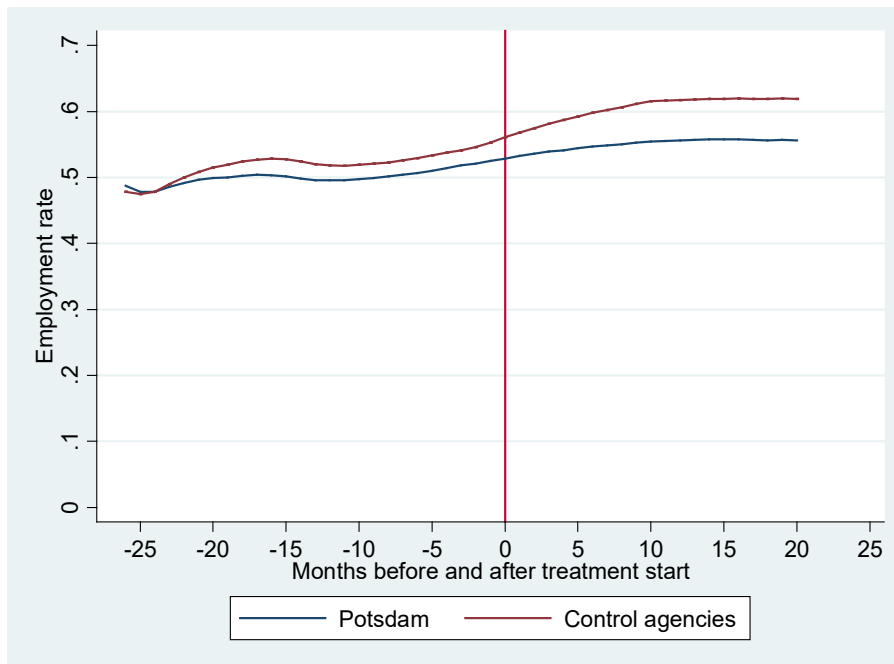
Source: Press Office Potsdam (2012).

Figure A 2: Employment rates of older workers by gender (seasonally adjusted)



Source: IEB. Own calculations.

Figure A 3: Employment rates of younger workers age 30 to45 (seasonally adjusted)



Source: IEB. Own calculations.

**Table A 1: Omitting employment agencies (DD)**

	(A)	(B)	(C)	(D)
Treatment effect	0.030*** (0.005)	0.036*** (0.004)	0.034*** (0.005)	0.036*** (0.005)
Individual socio-demographic characteristics	+	+	+	+
Individual labour market history	+	+	+	+
Time dummies	+	+	+	+
Regional characteristics	+	+	+	+
Employment agency excluded	Erfurt	Frankfurt O.	Jena	Magdeburg
N	1,281,628	1,266,380	1,365,978	1,223,429

Notes: Regional characteristics include agency dummies. \*/\*\*/\*\* indicates significance at the 10/5/1% level. Standard errors are clustered at the individual level.

Source: IEB and data of the Statistic Service of the Federal Employment Agency. Own calculations.

**Table A 2: Balancing properties of Nearest Neighbor matching**

	Younger men		Younger women		Older men		Older women	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
MSB before matching	5.56	5.29	5.10	4.83	3.67	4.02	4.29	3.73
MSB after matching	0.82	2.20	1.65	2.41	0.85	2.29	1.39	2.57
MedSB before matching	3.24	4.07	2.41	3.46	2.41	3.22	3.01	2.67
MedSB after matching	0.95	1.77	1.13	2.22	1.06	1.95	1.16	1.91
Off support control	0	0	0	0	0	0	0	0
Off support treated	4	13	15	7	8	7	15	13
N control	11,030	2,358	6,098	2,253	14,245	3,049	9,160	2,517
N treated	8,520	2,334	6,124	2,519	7,186	2,247	4,906	1,850

Source: IEB. Own calculations.

**Table A 3: Mean values before and after introduction of the campaign for different age groups**

	Before			After			Δafter - Δbefore
	Treated	Controls	Δ	Treated	Controls	Δ	
<b>Age 50-54</b>							
Male	0.597	0.602	-0.006***	0.569	0.606	-0.037***	-0.031***
Age (in years)	52.010	52.075	-0.065***	52.096	52.072	0.024***	0.089***
Highest vocational degree							
No vocational degree	0.036	0.024	0.012***	0.029	0.016	0.013***	0.000
Vocational degree	0.828	0.862	-0.034***	0.872	0.825	-0.048***	-0.013**
University degree	0.136	0.114	0.022***	0.147	0.111	0.356	0.013**
Employment history							
Tenure last job (days)	872.368	905.543	33.175***	854.626	724.960	129.666	162.841***
Last average daily gross wage (Euro)	55.594	52.514	3.081***	56.821	52.068	4.725***	1.672***
1 year before first ue spell							
Days in employment	203.269	209.136	-5.948***	208.909	218.381	-9.472***	-3.524
Days in unemployment	167.058	161.381	5.677***	161.386	149.331	12.921***	6.378***
Number of unemployment episodes	1.748	1.579	0.169***	1.732	1.541	0.191	0.022
Cumulated wage (Euro)	11577.79	11379.22	198.575***	11895.75	11507.41	388.343	189.768
5 years before first ue spell							
Days in employment	1193.957	1139.602	54.355***	1208.521	1128.297	80.225	25.869***
Days in unemployment	638.690	721.291	-82.601***	616.968	732.231	-115.264***	-32.663***
Number of unemployment episodes	4.690	5.009	-0.319***	5.007	5.637	-0.631***	-0.312***
Cumulated wage (Euro)	70357.99	63192.20	7165.788***	71167.07	60674.49	10492.58	3326.792***
N	104,180	224,357		65,627	154,713		
<b>Age 55-59</b>							
Male	0.582	0.575	0.008***	0.600	0.609	-0.009***	-0.016***
Age (in years)	57.037	57.120	-0.083***	57.039	57.128	-0.088***	-0.005
Highest vocational degree							
No vocational degree	0.040	0.027	0.013***	0.033	0.019	0.015	0.001
Vocational degree	0.781	0.814	-0.032***	0.801	0.823	-0.022	0.010*
University degree	0.179	0.160	0.019***	0.166	0.158	0.007***	-0.012**
Employment history							
Tenure last job (days)	990.971	1034.756	-43.785***	917.310	832.024	85.287***	129.072***
Last average daily gross wage (Euro)	55.794	53.169	2.625***	55.318	52.429	2.889***	0.265
1 year before first ue spell							
Days in employment	187.027	191.945	-4.918***	194.536	195.008	-0.472	4.446*
Days in unemployment	179.785	175.524	4.261***	168.094	161.991	6.103***	1.842
Number of unemployment episodes	1.646	1.516	0.130***	1.633	1.441	0.191***	0.061*

	Before			After			Δafter -
	Treated	Controls	Δ	Treated	Controls	Δ	Δbefore
Cumulated wage (Euro)	10488.64	10478.16	10.489	10567.26	10233.49	333.773***	323.285*
5 years before first ue spell							
Days in employment	1168.518	1153.936	14.582***	1185.315	1110.348	74.930***	60.348***
Days in unemployment	664.625	713.372	-48.747***	644.731	739.669	-94.939	-46.192***
Number of unemployment episodes	4.408	4.565	-0.157***	4.913	5.215	-0.302***	-0.145***
Cumulated wage (Euro)	69248.12	65201.04	4047.085***	68330.98	60458.45	7872.525***	3825.44***
N	108,638	295,003		68,152	187,827		
Age 60-64							
Male	0.616	0.652	-0.035***	0.627	0.677	-0.050***	-0.015
Age (in years)	61.255	61.128	0.128***	61.443	61.101	0.342***	0.214***
Highest vocational degree							
No vocational degree	0.042	0.035	0.007***	0.034	0.022	0.012***	0.005
Vocational degree	0.724	0.748	-0.024***	0.730	0.756	-0.026***	-0.003
University degree	0.234	0.217	0.016***	0.236	0.222	0.014	-0.002
Employment history							
Tenure last job (days)	1328.719	1428.118	-99.399***	1312.949	1173.983	138.966***	238.3647***
Last average daily gross wage (Euro)	66.761	60.895	5.866***	63.122	59.469	3.653***	-2.213
1 year before first ue spell							
Days in employment	162.755	198.391	-35.636***	139.894	191.726	-51.832***	-16.196***
Days in unemployment	200.313	148.876	31.436***	212.241	150.162	62.079***	30.643***
Number of unemployment episodes	1.548	1.367	0.181***	1.552	1.267	0.285***	0.104***
Cumulated wage (Euro)	10247.55	12226.58	-1979.03***	8400.831	11263.37	-2862.54***	-883.512***
5 years before first ue spell							
Days in employment	1277.024	1313.523	-36.500***	1208.163	1212.641	-4.478*	32.022***
Days in unemployment	551.107	547.044	4.063	616.309	618.014	-1.705	-5.768
Number of unemployment episodes	3.506	3.717	-0.211***	4.002	4.415	-0.413***	-0.202***
Cumulated wage (Euro)	81844.42	82163.40	-318.976	76376.37	73596.68	2779.693***	3098.669***
N	49,348	148,769		51,081	105,768		

Note: All numbers are shares unless otherwise indicated. \*/\*\*/\*\* indicate significant differences of mean values between workers in the treated employment agency and workers in the non-treated agencies on the 10%/5%/1% level.

Source: IEB. Own calculations.

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