

Empirical Article

Employment Effects of Incentivized Gradual Retirement Plans

Albert Rutten, Marike Knoef and Daniël van Vuuren

Tilburg school of Economics and Management, Tilburg, The Netherlands

This paper uses confidential microdata from Statistics Netherlands (CBS). The datasets we use can be obtained by filing a request directly to CBS. The abovementioned authors are willing to help others to get access to these datasets.

Correspondence concerning this article should be addressed to Albert Rutten, Tilburg University, Warandelaan 2, 5037AB, Koopmans Building (Room K342), Tilburg, The Netherlands. E-mail: a.t.g.j.rutten@tilburguniversity.edu

Decision Editor: Kene Henkens

Abstract

We investigate the effect of Incentivized Gradual Retirement plans (GRPs) on employment. GRPs encourage later retirement of older workers by offering a reduction in working hours with only a limited decrease in net earnings and pension accrual. A second policy aim is that municipalities use this freed up capacity to hire more young employees. We exploit variation in the availability of GRPs between Dutch municipalities to identify its employment effects. We find that GRPs increase labor supply for older civil servants by almost 7 full-time weeks on a yearly basis. We do not find an increase in the hiring of young workers.

Keywords: retirement behavior, financial incentives, administrative data, actual behavior

Most western countries are confronted with an increasing life expectancy and a decreasing fertility rate. Because of these developments, most countries implemented numerous reforms to increase the labor force participation rate among older workers (OECD, 2011). However, the implementation of these reforms raised questions about whether older workers are able to work longer. Therefore, different countries proposed different solutions. For instance, Austria implemented an early retirement scheme for workers in heavy occupations. In the Netherlands, several sectors chose to implement an incentivized gradual retirement plan¹ (hereafter referred to as GRP or the plural GRPs).

GRPs have been introduced in multiple sectors in the Netherlands such as construction, education, and various governmental organizations via collective labor agreements. The first goal of a GRP is to help older workers to reach the statutory retirement age healthily. This became especially important as the statutory retirement age has increased stepwise since 2013 from 65 to 66 years in 2018. In addition, substitution pathways into early retirement have been reduced during the last two decades (de Vos et al., 2018). From an employer's perspective, there are also reasons to introduce a GRP. For instance, an employer benefits from healthy and motivated employees (Veth & Van Vuuren, 2020). A GRP tries to achieve these goals by giving older employees a strong reduction in working hours, a small reduction in salary, and little to no reduction in pension

accrual. For example, the most often offered GRP plan in our data gives older workers the possibility to work 60% of their initial working hours while getting 80% paid and no discount on pension accrual. In other words, a GRP aims at creating an attractive package for older workers to reduce their working hours and increase their retirement age.

Goldin and Katz (2007) find that the labor force participation of older workers is partially determined by their skill compositions whereas Van Soest and Vonkova (2014) find that financial incentives play an important role. Euwals et al. (2010) find that individuals are more sensitive to the price of leisure than to changes in individual's pension wealth, indicating that the price of leisure is more important in the retirement decision. The introduction of GRPs reduce these opportunity costs. Lastly, the health of individuals (Weir, 2007) and social norms regarding labor force participation (Euwals et al., 2011) play as well an important role in labor force participation at higher ages.

The second goal of GRPs focus on the reduction of youth unemployment. As older workers reduce their labor supply, this could potentially create vacancies for younger workers and reduce youth unemployment in particular regions of the Netherlands. Therefore, the GRP is meant to be an effective tool to create a good mix between young and old workers.²

²For local government institutions (i.e., municipalities), there are two other minor reasons to implement a GRP. First, municipalities should integrate workers with a distance from the labor market. Second, the GRP can provide additional opportunities for the disadvantaged group(s) (de Pijper et al., 2019).

¹The Dutch name for those plans is “Generatiepact.”

Regarding the second goal, previous studies analyzed lump of labor fallacy, which concerns the substitutability of younger and older workers. They found that in the long-run these two groups are not substitutes when observing macro-economic data (Gruber & Wise, 2010). This means that youth and elderly unemployment tend to move in the same direction rather than the opposite, hinting at skill complementarity between those two groups (Kalwij et al., 2010).

In the short run, however, younger and older workers could be substitutable. Vestad (2013) analyzes how an early retirement program for older Norwegian workers affects youth labor force participation. He finds that substitution between younger and older workers is almost one-to-one. In a similar vein, Boeri et al. (2016) find that employers with a high number of senior workers were less likely to hire younger workers because of the increase in the retirement age.

We test whether GRPs in the Netherlands affect the labor supply of older workers and increased the number of younger workers working at municipalities, by making use of monthly Dutch administrative data for the period 2013–2018. We focus on municipalities with more than 100,000 citizens. As of January 2014, 19 municipalities (out of 32 with more than 100,000 citizens) adopted a GRP. Our rich administrative dataset provides us with monthly data on income and monthly hours worked on the individual level, as well as a large number of socioeconomic characteristics including birth year³ and gender. This makes it possible for us to exactly pinpoint the effects of the GRPs.

Using the municipalities that did not adopt a GRP as the control group, we make use of a difference-in-differences framework to establish the causal effects of GRPs.⁴ To make sure that the municipalities that did not adopt a GRP are a valid control group, we check for any significant differences between treatment and control group regarding financial solvency, voting outcomes, and youth unemployment.⁵ Since no significant differences occur, we are confident that the adoption of a GRP between treatment and control group can be considered as good as random allocation. This gives us confidence that we have a valid control group, which is also confirmed when analyzing the common trend assumption for older civil servants.

Our contribution to the literature is threefold. First, we contribute to the retirement literature on revealed preferences. As GRPs are often offered via informal agreements, only very few papers have been able to study revealed preferences (Elsayed et al., 2018). In our research design, however, it is perfectly clear how the GRP looks

like and who is eligible. This makes it possible to examine revealed preferences regarding retirement behavior. This as well helps us to identify the effect of GRPs on labor supply at higher ages (Albanese et al., 2020; Börsch-Supan et al., 2018; Gielen, 2009). With these results, we add to the broader discussion on the employment of older employees (Bolhaar et al., 2017).

Second, we add to the literature regarding the substitutability between younger and older workers. Gruber and Wise (2010) and Bertoni and Brunello (2021) focus, respectively, on several countries and a region to analyze short-term substitution effects. We focus on a particular sector instead. Moreover, we address whether the job prospects of young civil servants are positively or negatively affected by the introduction of a GRP. In particular, when older civil servants enroll in a GRP it may provide younger workers the opportunity to climb the career ladder and obtain a higher wage (Mohnen, 2019). Third, we add to the already small existing literature on GRPs. Van Dalen and Henkens (2019) argue that especially older wealthy individuals would be interested in participating in a GRP. Veth and Van Vuuren (2020) conduct interviews with older workers that participate in a GRP that was offered by their employers (both government and nongovernment employers). Their results are in line with Kantarci and Van Soest (2008). They found that GRPs could reduce the burden of work, resulting in a decrease of work-related stress and the motivation of employees. Our paper is, to our knowledge, the first paper that quantifies the effect of GRPs on a larger scale by looking at the employment of older workers and the hiring of young employees within the local government sector.

Analyzing the labor supply of older civil servants, we find that the treatment group increases their labor supply by on average 2.8 hr a month, which is almost equal to a full-time work week per year.⁶ There is however large heterogeneity for different ages. Moreover, we find that this increase in labor supply is particularly present in the middle- and high-wage income groups. In other words, the low-wage income group, which is most likely the group that needed the most help to reach the pension eligibility age healthily does not face a significant increase in hours worked after GRPs are implemented.

Examining the second goal of GRPs, we use again a difference-in-differences framework to estimate whether municipalities with a GRP hire more young workers when compared with municipalities without this program. We find that the number of younger workers does not significantly increase. In addition, we barely find an effect on wage growth for young workers.

The setup of the rest of this paper is as follows. The second section provides a literature review. The third section describes the institutional setting. The fourth section discusses the descriptive statistics and the fifth section describes the estimation. Lastly, the sixth section describes the estimation results and the seventh section concludes.

LITERATURE REVIEW

The aim of a GRP is twofold. The first aim is to make sure that older workers can reach the pension eligibility age and,

³We select older workers, who were born after 1950. Individuals born before 1950 were eligible for an attractive early retirement arrangement for older civil servants.

⁴Because the four largest municipalities in the Netherlands are atypical municipalities in terms of size, we exclude them from the main analysis. The regression results, however, do not differ much when we include them. These results are presented in Appendix V, which can be found at the end of this document.

⁵It is important to test for financial solvency, youth unemployment, and voting preferences as these may affect the adoption of GRPs in different ways. First, as GRPs could be financially costly, it could be the case that municipalities that are financially more solvent are more likely to adopt a GRP. Regarding youth unemployment it could be the case that municipalities with a high unemployment level are more likely to adopt a GRP to create jobs. Lastly, if municipalities in the treatment group are more likely to vote for left wing than right wing parties, this may drive the adoption of GRPs. In Appendix I, we show that there are no significant differences between treated and control group in these fields.

⁶A full-time work week for civil servants in the Netherlands equals 36 hr per week.

hence, to prevent older workers from dropping out of the labor force. The second aim of a GRP is to increase the employment rate of younger workers. To start with the already existing literature on the former, most OECD countries see an increase in the labor force participation of older workers. The Netherlands is no exception to this (Verkooijen, 2017). The first subsection provides an overview of the policies that may already have contributed to the increased labor force participation of older workers. In general, three types of policy measures affect the employment levels of older workers: supply-side policies, demand-side policies, and policies that influence institutional factors. For the last component, we limit ourselves to the Netherlands in this review. In the second subsection we discuss the substitutability between young and old workers.

Employment of older workers

The skill composition of workers is an important component for explaining the supply-side factor. Especially, education plays an important role (Goldin & Katz, 2007). Their paper argues that an increase in education level increased labor force participation as the opportunity cost of not working is higher. Second, on the job training seems to have a positive effect on employment prospects for older workers in the Netherlands (Picchio & Van Ours, 2013). In particular, if workers know that they need to work longer, they have an incentive to maintain their skill level and therefore take up additional training (Montizaan et al., 2010).

Third, financial incentives play an important role for older workers to leave the labor force. For instance, it seems that during recession older workers are more likely to leave the labor force and retire. These effects are particularly strong for the lower educated workers who depend heavily on their first pillar pension benefits and therefore have lower opportunity costs to retire (Coile & Levine, 2011). On the other hand, lower-income workers are more liquidity constraint. Therefore, they are more likely to work until higher ages (Bolhaar et al., 2017). The question how flexible labor supply at higher ages affects retirement decision and total labor supply is still an open question (Börsch-Supan et al., 2018; Gielen, 2009; Hernæs et al., 2020; Machado & Portela, 2014). A paper by Van Soest and Vonkova (2014) use stated preferences to investigate whether older workers like to retire earlier with actuarially fair adjusted replacement rates. They find that retirement behavior is very sensitive to financial incentives. In case, the rewards for retiring later and the penalties for retiring earlier were reduced by 50%, the average retirement age would fall by about 10 months. Analyzing the labor supply of older workers using vignettes, Elsayed et al. (2018) find that the full-time retirement age is on average 1 year later. However, the total labor supply decreases over the period by 3.4 months. This indicates that GRPs do not contribute to an increase in the aggregate labor supply of workers close to retirement. Analyzing revealed preferences, Euwals et al. (2010) exploit the variation in the starting dates of the transitional arrangements from actuarially unfair schemes to more actuarially fair schemes for older workers. They find that the individuals are more sensitive to the price of leisure (substitution effect) than to changes in an individual's pension wealth (wealth effect). This indicates that foregone wages are a more important opportunity cost than

foregone pension accumulation. In a similar vein, Albanese et al. (2020) study the effect of a gradual retirement scheme in Belgium. They find that gradual retirement increases labor force participation at younger ages (below 60), but it decreases thereafter. This could be explained by employers who view enrollment into gradual retirement as a preference for early retirement. A fourth and fifth explanation for the increase in the labor supply of older workers is social norms (Euwals et al., 2011) and reference points regarding the retirement age (Behaghel & Blau, 2012). Lastly, the increase in health at older ages and the fact that higher educated jobs are less physically demanding makes it possible for workers to work at higher ages. Although health does on average decline with age, Weir (2007) shows that a large part of workers in their 60s and 70s are still physically capable of working.⁷

There are as well several demand-side factors that could explain an increase in the labor force participation of older workers. As the education gap between younger and older cohorts decreases, younger and older workers become closer substitutes. An analysis of U.S. data shows that the oldest generation had on average 2.6 years less education when compared with the youngest generation in 1990. In 2030, it is projected to be only 0.5 years. The increase in substitutability is particularly the case in jobs where experience plays a dominant role, making it more attractive for employees to hire older workers (Goldin & Katz, 2007). On the other hand, age discrimination makes it more difficult for older workers to remain employed (Lahey, 2008; Schippers & Vlasblom, 2019).

Lastly, several institutional changes increased the labor force participation of older workers. Limiting ourselves to changes in the Netherlands, the increase of the statutory retirement age since 2013 and the abolition of publicly funded partner pension in 2015 provided a financial incentive for workers to work longer (Atav et al., 2021; Doove et al., 2019). Focusing on GRPs, one study shows that older workers with a high level of equity are particularly interested in a GRP (Van Dalen & Henkens, 2019). This is in line with Hofäcker et al. (2016) who find that mainly high-income employees benefit from retirement policies. Another interview-based study concluded that both employers and older employees are satisfied with the introduction of a GRP (Veth & Van Vuuren, 2020). In particular, they find that the motivation and energy level of older workers increase when they participate in a GRP arrangement, contributing to a positive effect on overall well-being. Kantarci and Van Soest (2008) find similar results for GRPs in general.

Substitution between younger and older workers

Having discussed the literature on the employment levels of older workers, we now describe the existing literature on the substitutability between younger and older workers. Starting at long-run macroeconomic effects, Kapteyn et al. (2010, Chapter 8) examine the VUT arrangement in the Netherlands. This program was originally implemented in 1975. This arrangement aimed at reducing youth

⁷Damman and van Solinge (2017) use Dutch data to show that paid work is substitutable for unpaid (voluntary) work, indicating that older workers are not necessarily longer active in the labor force.

unemployment by letting older workers retire earlier. By analyzing time series data, they conclude that this program did not succeed in its goal. Instead, they found that there is a positive relationship between youth employment and the employment of older workers, indicating that younger and older workers compete in different segments of the labor market. These findings are in line with various other OECD countries (Gruber & Wise, 2010; Kapteyn et al., 2010, Chapter 8).

However, these estimates are based on long-run macrodata. Several studies find that in the short-run substitution is still possible. Vestad (2013) analyzes how a national early retirement program in Norway affected youth employment. He found that there is a one-to-one substitution between an older worker that retires early and every (young) new labor entrant. When focusing on micro-level data, Boeri et al. (2016) analyze how an increase in the statutory retirement age in Italy affected youth employment. By making use of a database from the Italian social security administration, they can identify which private firms have a large share of workers that are exposed to this increase. They find that firms with a high number of senior workers significantly reduce youth hirings. More precisely, they find that out of 150 thousand youth jobs lost during the Great Recession, 36 thousand job losses can be attributed to the increase in the statutory retirement age. Bertoni and Brunello (2021) find similar results when analyzing the same reform while focusing on regional employment. However, Carta and Von Wachter (2021) find there does exist complementarity between the hiring of younger and older workers. In particular, they find that an increase in the number of older workers by 10%, increases in the number of young workers by 1.8%.⁸

INSTITUTIONAL FRAMEWORK

Before focusing on the GRPs in municipalities, it is important to know that other sectors in the Netherlands offer as well GRPs. For instance, the education sector, the engineering sector, and the construction sector offer similar plans. Also, some other governmental bodies, such as the provinces,⁹ have implemented GRPs. This shows that GRPs are becoming a widely implemented program in the Netherlands. This makes a large-scale economic analysis of its effects important. However, the municipality sector differs in several ways of other sectors in the Netherlands. For instance, the percentage of female workers tend to be slightly higher (2%-points) for civil servants when compared with the overall labor force.¹⁰ Next to this, civil servants work more often full-time compared with the labor force (A+O fonds Gemeenten, 2018). The share of civil servants that are highly educated is also high when compared with other sectors. In 2014, 55.5% of all civil servants have obtained a form of higher education (Walstra, 2017). Besides, civil servants tend to be older than workers in other sectors. In particular, the

group of workers above the age of 55 is almost twice as large in the municipality sector compared with the overall labor force (A+O fonds Gemeenten, 2014). Moreover, the sickness leave is as well higher when compared with other national organizations (A+O fonds Gemeenten, 2018). We first analyze why both demand and supply of labor are in favor of GRPs. Thereafter we discuss how GRPs were implemented in municipalities.¹¹ Lastly, we mention other potential municipality programs that may affect the take-up rate of a GRP.

Reasons for implementing a GRP

Both employers (labor demand) and employees (labor supply) could benefit from GRPs. In this paragraph, we discuss why each of these groups could be in favor of GRPs. Analyzing the employer's side, it is important to distinguish the two roles for local government bodies, namely the municipality as an employer and the municipality as a government institution. Both of these can play a role in implementing GRPs. From a government perspective, one of the main reasons is the reduction of youth unemployment. This is in line with the local government's task regarding labor market integration. This states that it is the task of municipalities to help workers find a job if they are unlikely to succeed in this task by themselves¹² (de Pijper et al., 2019). Another reason for offering GRPs is to help disadvantaged young individuals with a migration background.

From an employer perspective, there are several reasons to invest in the employability of older workers.¹³ Oude Mulders et al. (2020) show that Dutch employers are concerned with the limited flexibility the Dutch pension system offers. More precisely, the recent reforms that aim at increasing the labor force participation of older workers makes it harder to gradually transition into retirement. In addition, Dutch employers are pessimistic about the effect of an aging workforce on labor productivity. The introduction of GRPs could provide a solution to these problems as it will not only smooth the retirement transition but may as well reduce labor cost for older workers. Although hourly wages of older civil servants will increase, their total wage will go down. In addition, GRPs may contribute to a better mix of younger and older civil servants. One out of every six employees was older than 60 in 2018 across all Dutch municipalities. Besides, the average age of civil servants is 2 years higher when compared with the average age of the labor force (48.1 vs 46.3). Lastly, the amount of young civil servants below the age of 35 is on average 24 percentage points lower when compared with the average of the labor force (Bekkers, 2019). The implementation of GRPs could therefore be used to create a better mix of young and old workers.

Another reason to implement GRPs is to keep older workers healthy and productive. This may also explain the large interest in GRPs. For instance, Van Dalen and Henkens (2019)

⁸The differences in the studies can most likely be explained by the use of different datasets. In particular, Boeri et al. (2016) have data for the years 2008, 2011, and 2014 whereas Carta and Von Wachter (2021) have data for the period 2010–2014 for every year.

⁹The Dutch name for this governmental body is the "Provinciale Staten."

¹⁰In 2013, the percentage of female civil servants was 48% where in the overall labor force this percentage was equal to 46. In 2017, the percentage of female civil servants was 50% compared with 47% in the total labor force.

¹¹The reason we limit our scope to municipalities is that for this group we can exactly determine at which municipality people work. We do not have data for private sector firms at the local level.

¹²In case, the municipality thinks it is highly unlikely this person finds a paid job, then the focus will shift toward any form of participation within the society.

¹³The reasons for implementing a GRP originate from the same documents we use to construct the characteristics of GRPs for each municipality (see the next section).

found that 60% of workers between the ages 40–60 would be potentially interested in participating in a GRP. A reduction in working hours may for example reduce stress levels for older employees and/or increase a better work–life balance. Several older civil servants that participated in a GRP already indicated that they feel more energized when compared with the time they worked full-time (Veth & Van Vuuren, 2020). This is also in line with the findings from van Van Solinge et al. (2023). They show that gradual retirement could have a positive effect on energy levels, which may contribute to healthy aging of older workers. Besides, letting older workers work part-time until their pension eligibility age may have positive side effects. It could for instance lead to fewer days of sick leave and, hence, a decrease in labor costs. Second, it may lead to more motivated workers due to a better work–life balance. This could result in more satisfied employees and an increase in labor productivity (A&O fonds Gemeenten, 2020).

From the employee's side, labor unions are in favor of GRPs for two reasons. First, it spares older workers and gives them more time to recover from their work. It is as well possible to see this as a claim for higher wages for the effective time worked. Second, the Dutch labor unions support this plan as they see it as a way to increase the employment chances of younger workers (although this argument is disputable when examining the literature as was done in the previous chapter). They argue that if, for instance, two older workers decrease their labor supply by 40% in a full-time contract, a young worker can receive a contract of 0.8 FTE. Apart from reducing youth unemployment, they as well claim that the quality of the jobs for younger workers may improve (FNV, n.d.).

The Incentivized Gradual Retirement plans

As of 2014, some municipalities adopted a GRP. Each municipality has the option to introduce a GRP according to the collective labor agreement. However, this does not mean that each municipality is obliged to do so. A potential reason for not adopting is that smaller municipalities are not willing to introduce a GRP. If they only have a limited amount of older workers, then they cannot free up sufficient capacity to hire young workers (Niemeijer, 2017).

Investigating the aims of GRPs, the goal of this plan is twofold. First, it should prevent older civil servants working at municipalities to drop out before reaching the statutory retirement age. Second, as older employees start to reduce their labor supply, local municipalities need to hire new workers. Municipalities aim to fill these vacancies with young employees, thereby reducing local youth unemployment.

Focusing on the first goal, due to the increase of the Dutch statutory retirement age to 66 in 2018, it is unknown how many workers can work full-time at higher ages. Therefore, Dutch municipalities offer their older employees different forms of GRPs that allows them to work less with a small reduction in salary and no (or little) reduction in pension accrual. These programs are, for instance, abbreviated in the form of 60-80-100. This means that a civil servant works 60% of his initial working hours against 80% of his

original salary while maintaining a 100% pension accrual when participating in a GRP.¹⁴ Other arrangements such as 50-75-100 or 80-88-88 have a similar meaning. Once a civil servant participates in a GRP, the decision cannot be reversed. More precisely, provided that the civil servant does not switch to another sector, he or she will be paid according to what is agreed upon in that particular GRP up to reaching the statutory retirement age. Moreover, in case of any disability, only the employee can decide to end the participation in a GRP. Lastly, the employer may decide in some cases that a particular person is not allowed to enroll in a GRP. This could be the case when a certain department already has a large number of civil servants enrolled in a GRP and the head of that department fears that a further reduction of experienced workers may negatively affect the department's productivity.

As already stated, each municipality decides on its own (a) whether it offers a GRP for its older employees and (b) in what form, which creates heterogeneity between GRPs across municipalities. Niemeijer (2017) shows that smaller municipalities are often not willing to introduce a GRP. This is because smaller municipalities are not able to free-up sufficient capacity to hire younger employees. However, also when looking at larger municipalities with more than 100,000 citizens, there is considerable variation between municipalities that introduce a GRP and those that do not. Table 1 provides an overview of which municipalities did and did not introduce a GRP over the period 2012–2018. We only focus on these years due to data availability (we will show this in the next section). The treatment group consists of all municipalities that adopted a GRP in the period 2012–2018 and have more than 100,000 citizens. The control group consists of municipalities that did not adopt a GRP in

Table 1. Overview of treatment and control group.

Treatment group (municipalities with GRP)	Control group (municipalities without GRP)
Den Haag	Amsterdam
Utrecht	Rotterdam
Eindhoven	Almere
Groningen	Breda
Tilburg	Apeldoorn
Nijmegen	Zaanstad
Haarlem	Arnhem
Enschede	's-Hertogenbosch
Amersfoort	Zoetermeer
Haarlemmermeer	Maastricht
Zwolle	Dordrecht
Leiden	Venlo
Leeuwarden	Ede
Alphen aan den Rijn	
Westland	
Alkmaar	
Emmen	
Delft	
Deventer	
Total: 19	Total: 13

Note. GRP = gradual retirement plan.

¹⁴Note that the Netherlands has a progressive income tax, meaning that the net differences before participating in the municipalities GRP and thereafter is smaller than a decrease in salary of 20%.

the period 2013–2018 and have more than 100,000 citizens. The four biggest municipalities, Amsterdam, Rotterdam, the Hague, and Utrecht (hereafter referred to as G4) have in total 43% of the total amount of civil servants. Therefore, we provide the graphs and the estimation results in the next section excluding the civil servants of these municipalities.¹⁵

Table 2 shows an overview of the type of GRP that each municipality in the treatment group offered. In particular, Table 2 shows that there are several dimensions in which GRPs differ across municipalities. To start with, the age at which a civil servant can enroll differs. Most municipalities allow civil servants to enter the program when they reach the age of 60. Deventer, Alkmaar, and Zwolle, however, allow people to enter earlier as of age 55, 57, and 58, respectively. There are as well some municipalities that only allow workers to enroll in the program after they reach the age of 60. More precisely, Westland, Eindhoven, and Amersfoort have an eligibility age of 61, 62, and 63, respectively. Analyzing the contractual details, some municipalities require civil servants to have a minimum number of service years at that municipality, while others require them to have a permanent contract. Municipalities like Tilburg and Alphen aan den Rijn require both a minimum number of service years and a permanent contract. Focusing on the minimum hours that an employee needs to work after participating in a GRP, there is as well variation between municipalities. Most municipalities do not require a minimum number of hours that need to be worked after participating. However, Deventer and Amersfoort require a minimum amount of working hours of at least 21.6 hr, the highest of all municipalities that adopted a GRP. When examining the options regarding payment, most municipalities offer a GRP in which there is no discount on pension accrual. However, some municipalities like Enschede, Zwolle, Emmen, and Deventer offer a discount on pension accrual once participating. In case, the program has the word “different” as an option it means that there is the possibility to tailor a GRP for each civil servant that wants to participate. Lastly, the starting dates of a GRP across all municipalities are somewhere between January 2014 and July 2018.

Other programs and limitations

Having discussed the GRPs and its details for multiple municipalities, it is also important to discuss other programs that may affect the willingness of civil servants to participate in a GRP. For instance, civil servants born before 1950 could make use of the FPU arrangement. This arrangement made it attractive for workers to retire earlier than the statutory retirement age. Although we can exclude workers born before 1950 from the analysis, it may still affect the work force composition of each municipality. In particular, if the group born before 1950 serves as the reference group for workers borne after 1950 in some municipalities, it may affect the willingness to introduce GRPs. Other programs that make it less likely for participants to participate in a GRP are the “55-years arrangement” and the “60-years arrangement.”¹⁶ The content of these arrangements differs per municipality and are therefore often informal arrangements

between the municipality and their employees (i.e., they are not the same for all municipalities in the Netherlands). For instance, in the municipality of Alkmaar, it is possible to work fewer hours a week (up to 2.5 hr) without receiving any discount in salary. In Amsterdam, however, it “only” states that a civil servant does no longer has to work night shifts and overtime after reaching a particular age. It is important to note that these arrangements exist in municipalities regardless of whether they adopted a GRP or not, indicating that these arrangements are not a substitute for GRPs.

Moreover, several financial incentives for older civil servants changed over the period 2013–2018. Considering the labor supply side, the work bonus¹⁷ was abolished for workers born after 1953. This both affected civil servants in the treatment and control group. The work bonus consisted of an income-dependent tax credit for older workers, which made it more attractive to continue working (Ambtenarensalaris, nl, 2020). Considering the labor demand side, the premium discount for younger and older workers was replaced by a wage cost–benefit scheme as of January 2018.¹⁸ The latter is as well a premium discount for workers with a distance from the labor market, but the new discounts are less generous when compared with the previous premium discounts (Rijksoverheid, s.d.; Rijksoverheid, n.d.). This reduction affects both the treatment and control group. However, we are unfortunately not able to determine whether one group is affected more or less by this measure.

Lastly, when looking at the effect a GRP has on hiring younger workers, municipalities could receive a subsidy via the A&O fund¹⁹ (when hiring young employees). This concerns the period 2015–2018. Research by the Ministry of Internal Affairs shows that municipalities seemed unresponsive to incentive changes to remain eligible for the subsidy.²⁰ Therefore, they concluded that this subsidy seems not to have a large impact on the hiring decisions by municipalities (Ministry of Internal Affairs, 2019). Just like with the previous measure we cannot rule out that either the control or treatment group made more use of the subsidy than the other group. However, we do know that all of the abovementioned financial incentives affect both the treatment and control group. In other words, it is not the case that either of these financial arrangements was particularly targeted at either the treatment or the control group.

DESCRIPTIVE STATISTICS

Having discussed the institutional framework, this section describes the data we use. We focus on municipalities with more than 100,000 citizens. We focus on big municipalities as smaller municipalities may be less likely to introduce a GRP (Niemeijer, 2017). In addition, Oude Mulders and Henkens (2019) show that larger organizations are much more likely to implement adjustment measures to facilitate longer working lives. The reason for this is that larger organizations typically implement uniform employee policies.

¹⁷In Dutch: werk bonus.

¹⁸In Dutch: Loonkostenvoordelen (LKV).

¹⁹In Dutch: A&O fonds gemeenten.

²⁰In 2018, municipalities had to offer young employees a 2-year contract instead of one. However, rarely did municipalities deviate from the standard 1-year contract they regularly offered.

¹⁵In Appendix V, we display the results when we include the G4 municipalities as a robustness check. This appendix is displayed at the end of this document. The results do not change much in terms of sign, significance, and magnitude.

¹⁶The implementation of these programs does not coincide with the adoption of a GRP.

Table 2. Overview of GRP across municipalities.

Municipality	Minimal age	Minimal service years	Option(s)	Start-date (dd-mm-yyyy)	Permanent contract	Minimum hours after GRP
Den Haag	60	2	60-80-100	01-10-2015	X	–
Utrecht	60	–	60-75-100	01-03-2016	X	–
Eindhoven	62	–	60-75-100 60-80-100	01-04-2017		–
Groningen	60	1	Different ^a	01-01-2014		–
Tilburg	60	5	80-90-100	01-07-2018	X	14.4
Nijmegen	60	–	50-75-100 60-80-100 80-90-100	01-09-2017	X	–
Haarlem	62 (60)	–	60-80-100 (80-90-100) ^b	01-04-2017 (01-04-2018)		18
Enschede	60	–	80-80-90 60-70-85	01-02-2016		16
Amersfoort	63	–	60-70-100	01-10-2017	X	21.6
Haarlemmermeer	60	–	60-80-100	01-07-2018		–
Zwolle	60 (58) ^d	–	80-90-90 (80-95-95)	01-07-2017 (01-10-2017)	X	18
Leiden	60	5	Different ^c	01-05-2016		–
Leeuwarden	60	3	80-90-100	01-05-2016		18
Alphen aan den Rijn	60	2	70-85-100	01-04-2017	X	18
Westland	61 ^e		60-80-100 80-90-100	01-01-2017		–
Alkmaar	57 ^f	5	50-75-100 65-80-100 80-85-100	04-01-2018		–
Emmen	60	1	80-90-90	01-03-2015		18
Delft	60 ^g	0	60-80-100 80-90-100 50-70-100	01-01-2017		–
Deventer	55	1	80-88-88 60-76-76	01-10-2015	X	21.6

Note. GRP = gradual retirement plan.

Sources: Gemeente Alkmaar (2018), Alphen aan den Rijn (2017), Gemeente Amersfoort (2017), Gemeente Delft (2016), Gemeente Den Haag (2015), A+O fonds Gemeenten (2015), Gemeente Eindhoven (2017), Gemeente Emmen (n.d.), A+O fonds Gemeenten (2016), Gemeente Groningen (2013), Gemeente Haarlem (2017, 2018), Gemeente Haarlemmermeer (2019), Gemeente Leeuwarden (2016), Gemeente Leiden (2018), Gemeente Nijmegen (2017), Gemeente Tilburg (2018), Gemeente Utrecht (2015), Gemeente Westland (2016), Gemeente Zwolle (2015), and Gemeente Zwolle (n.d.).

^aTheir GRP was here part of a social arrangement.

^bThat option became 1 year later available.

^cAn employee can ask for a reduction of working hours up to 40%.

^dThe municipality of Zwolle changed their GRP in October 2017, 3 months after the initial implementation. Another option became available (80-95-95) as well as a decrease in the eligibility age.

^eFive years prior to pension eligibility age.

^fTen years prior to pension eligibility age.

^gSeven years prior to pension eligibility age.

Smaller organizations could deal with this issue in a more improved manner. We will implement in Estimation method, a difference-in-differences strategy to analyze the effect of GRPs. Therefore, we will order the data in this section into a treatment and control group. The treatment group consist of those municipalities that obtain a GRP in the period 2012–2018. The control group consist of municipalities that do not introduce a GRP (see Table 1 for an overview of treated and nontreated municipalities). Given our limited sample size, it is not possible to exploit differences in policy parameters in the municipalities that adopt a GRP.²¹

²¹For instance, it would be interesting to observe whether different packages (60-80-100 vs 80-88-88) would lead to different results.

We as well check whether the common trend assumption holds, which is the key identifying assumption of a difference-in-differences design. We check this assumption for different variables. In Appendix I, we discuss whether endogenous adoption could have played a role in the adoption of GRPs by comparing the youth unemployment rates (25–45), the difference in political orientation²² between the treatment and control group before the GRPs were implemented, and the

²²Political orientation could play a role in the adoption of GRPs when considering government spending. Right wing parties may be more likely to reduce (or limit) government spending, while left wing parties are more likely to increase (or prevent budget cuts) in government spending. As a result, the adoption of GRPs could be driven by political preferences. That is why we check for this.

financial position of municipalities. We conclude that there is a common trend across treatment and control municipalities. Regarding the voting behavior, we only observe small differences, but none are significant at the 5% level when focusing on the p -value. The same holds as well for the financial position when comparing solvency ratios between the treatment and control group. Moreover, we do not see that over time the inflow of older workers is higher in municipalities with a GRP when compared with municipalities without a GRP.

In this section, we show whether there is a common trend visible in the number of hours worked before a GRP is implemented. The same also holds for the percentage of young civil servants employed by a particular municipality. We show this common trend in [Appendix I](#). All of the above makes us believe that we have a good control group that helps us identify the effects of GRPs and our difference-in-differences framework is a valid estimation method.

We use administrative microdata from Statistics Netherlands to analyze the effects of GRPs ([Statistics Netherlands \(CBS\), s.d.](#)). Using these data,²³ we construct the number of old and young civil servants that work at a particular municipality in a particular month over the period 2012–2018.²⁴

We select older workers at municipalities as follows. We select civil servants who have worked for the same municipality since 2010. All civil servants remain are part of the sample until they reach the pension eligibility age. Older workers are 60 years or older and should be born after 1949. By selecting older civil servants in this way, we make sure that the FPU-early retirement arrangement does not play a role in determining the effect of a GRP. Moreover, we drop civil servants that are employed by more than one employer in the period 2012–2018.²⁵ Besides, we omit observations for civil servants that are employed after the statutory retirement age.²⁶ We define younger workers when they are older than 18 and younger than 30. For younger workers, we do not impose any restrictions. More precisely, this means that younger workers are allowed to have multiple employers. The reason we do this is that the introduction of a GRP does not

necessarily mean that younger workers get a full-time contract at a municipality.²⁷

In our dataset, we have several socioeconomic variables on each civil servant as well as work-related variables. Regarding the socioeconomic variables, we observe the civil servants' gender, birthdate, age, the presence of children in the household, and their marital status. Regarding the economic variables, we observe the monthly salary, the monthly hours worked, the number of full-time days per month as well as the number of days a civil servant was employed in a particular month. These last two variables allow us to create a part-time factor for each civil servant in a particular month. This part-time factor is defined as hours worked divided by full-time hours. The part-time factor allows us to measure how the labor supply of civil servants increases (or decreases) at the intensive margin. Therefore, we expect the part-time factor for older workers to decrease at municipalities after a GRP is introduced. [Appendix II](#) provides summary statistics of older and younger workers based on the adoption of a GRP. In other words, we divide our statistics into a treatment and control group.

[Tables 10 and 11 in Appendix II](#) provide summary statistics for older civil servants at municipalities (with more than 100,000 citizens) that did and did not adopt a GRP in the period 2012–2018. Observing the monthly income of civil servants at municipalities that did and did not adopt a GRP, we see that the income of civil servants working in a municipality without GRP increases over time. In 2012, the difference between those groups was €426, and in 2018 this has decreased to €323. This decreasing wage gap is associated with a smaller decrease in the part-time factor as well as working hours for municipalities that introduced a GRP. For municipalities without a GRP, this decrease is larger.

Discussing the socioeconomic characteristics, we observe that the percentage of male workers is approximately equal between municipalities with and without GRP. The same holds as well for the percentage of married/cohabiting civil servants. When considering immigrant status, municipalities without a GRP tend to have both a higher rate of first- and second-generation immigrants. More precisely, municipalities with a GRP have 4.9%–6.6% first- or second-generation immigrants whereas municipalities without GRP have 5.7%–6.7% of immigrants working as civil servants. Lastly, the mean age is the same in each year for both groups when rounded to one decimal. In total, we have 14,389 unique observations of which 5,982 are working for municipalities without a GRP, and 8,407 are employed for municipalities that introduce a GRP over the period 2014–2018.²⁸

[Tables 12 and 13 in Appendix II](#) show summary statistics for younger civil servants aging from 18 to 30. We again show the summary statistics separately for workers that work for municipalities with and without a GRP. The differences between those two groups are again small. We observe that the

²³We will make use of the following files: *gbahuishoudensbus*, *spolisbus*, *gbapersoonstab*, and *gemeentestplab*. The latter file is used to pinpoint in which municipality a civil servant works. More precisely, when using the “*rinpersoons*,” “*rinpersoon*,” and “*ikvid*” number from *spolisbus* after determining that individuals have the “*scaosector*” of a municipality, we can match the likewise named variables with the variables in *gemeentestplab*.

²⁴See Institutional framework, other programs and limitations.

²⁵The reason for this is twofold. First, we do this to drop older civil servants that select into GRPs to increase their labor supply in another sector. In particular, if older workers use the municipalities' GRP to increase their labor supply in another sector, then a GRP does not help workers to remain employable at a higher age. As we want to test the latter, it does not make much sense to have workers in our sample that use the municipalities' GRP for other reasons. Second, it is impossible to determine the effect of the introduction of GRP for civil servants that are employed by multiple or switch between municipalities. In particular, consider a civil servant to increase his or her labor supply in a municipality without a GRP and decreases their labor supply in a municipality with a GRP. This pattern can arise because (a) one municipality has an increase in demand and the other one a decrease or (b) the civil servant participated in the municipalities' GRP and as a result of this decrease in his or her labor supply in one municipality and increases his or her labor supply in the other one. For all municipalities in the Netherlands, this means that we drop 40% of all our observations over the period 2010–2018.

²⁶The main aim of the GRPs is to let older civil servants reach the pension eligibility age. If civil servants decide to continue working after the pension eligibility age, this can be due to other institutional factors as well such as the Continuing to Work Act (in Dutch: “*Wet langer doorwerken na AOW*”).

²⁷This is approximately 5% of our sample.

²⁸We allow workers to work for another municipality for the period 2013–2018. This means as well for instance civil servants could be employed for a municipality that did not have a GRP in the period 2013–2015 and thereafter switch to a municipality with a GRP. However, we find the number of civil servants switching between those groups (and switching to both sides) to be very small (less than 25. The amount is 25 when we include G4 municipalities). Therefore, we do not believe that self-selection plays an important role.

mean monthly income, the part-time factor, and the mean of working hours per month are approximately equal. The percentage married/cohabiting and the percentage with child is approximately 2%–6%-points higher for municipalities without a GRP.

Lastly, the age difference between younger civil servants that work at municipalities with and without a GRP is almost negligible. In total, we have 6,184 young civil servants that work for municipalities without a GRP and 8,274 civil servants that work for municipalities that introduce a GRP over the period 2014–2018.

Graphical evidence

Having discussed the differences between municipalities with and without a GRP, it is important to analyze whether there is a common trend between those two groups of municipalities as it is the key identifying assumption in a difference-in-differences framework. Figure 1 shows the monthly average hours worked of civil servants above 60 at municipalities with and without a GRP. We observe that in the years 2012 and 2013 there is a common trend between the (treated) municipalities with a GRP and the (nontreated) municipalities that did not adopt a GRP. After 2014, the monthly average hours worked starts to decline while the gap between the treatment and control group slightly decreases over time.

Figure 2 shows the extensive margin for the (treated) municipalities with a GRP and the (nontreated) municipalities that did not adopt a GRP. More precisely, we create an extensive margin variable that is equal to unity in case a civil servant works at least 1 hr in a particular month. In case, a civil servant decided to stop working (i.e., works zero hours per month), the variable equals zero. Not working is in this definition almost equivalent to retirement. If GRPs succeed in letting older workers reach the pension eligibility age, we expect that the labor supply by the extensive margin declines less overtime in the treatment group than in the control group. Analyzing Figure 2, we observe that there is a large decline in the extensive margin between the treatment and control group. More precisely, in 2012 there is a difference of approximately 0.2 between the treatment and control group. At the end of 2018, this gap decreased by approximately 0.1. This may indicate that GRPs make it possible for older workers to work longer.²⁹

Figure 3 shows the monthly percentage of young civil servants employed at municipalities with and without a GRP. More precisely, we divide the number of young civil servants (18–30) by the total amount³⁰ of active civil servants for the treatment and control group separately. After multiplying this number by 100, we get the percentage of young civil servants working at municipalities for each month for both the treatment and control group. In the year 2013, we again observe a common trend between municipalities that adopted and did not adopt a GRP. We as well observe that for both the treatment and control group the percentage of young civil servants increases over time. Lastly, we observe an increase in the number of young

civil servants in the last quarter of each year followed by a drop in the number of civil servants in January. This is probably due to the inflow of young workers trainees by municipalities. The sharp decrease is in line with a large group of young civil servants that leave the municipality within 1 year.³¹

Unlike the previous figure, it is hard to observe any increasing or decreasing trend for the treated and nontreated municipalities. We as well plot the absolute number of young workers between the treatment and control group in Appendix III. If we do this, we observe a similar pattern.

ESTIMATION METHOD

We analyze the effect of GRPs on the labor supply of older workers and the hiring of younger workers. We use a difference-in-differences approach, comparing civil servants in municipalities with and without GRPs, before and after the GRPs become available. Generally, we estimate a regression of the form:

$$y_{imt} = \alpha + \gamma_t + \lambda_m + \beta_1 D_{imt} + \beta_2 A_{imt} + \beta_4 X_{it} + \epsilon_{imt} \quad (1)$$

Here, y_{imt} denotes the labor supply of individual i at municipality m in month t , in terms of monthly hours worked (intensive and extensive margin) or the participation rate (only extensive margin). α is a constant. γ_t and λ_m denote time dummies for each year–month combination and municipality dummies, respectively. The variable D_{imt} is a dummy variable equal to unity when an individual works at a municipality that has a GRP available in that month. Its coefficient captures the effect of a GRP on labor supply. The vector X_{it} contains control variables and A_{imt} denotes a set of dummies for the ages 60–65. We control for gender, first- and second-generation immigrant, marital status, and whether the civil servant has children living at home. In addition to the basic specification, we also run a regression where we add an interaction term of age and GRP: $A_{imt} * D_{imt}$. Lastly, ϵ_{imt} denotes the error term.

In order to analyze the effect of GRPs on the hiring of young workers,³² we estimate the following regression equation:

$$\log(L_{ymt}) = \zeta + \eta_{yt} + \mu_{mt} + \lambda_m + \beta_3 D_{mt} + \rho_{mt} \quad (2)$$

The dependent variable is the percentage of young workers and the natural logarithm of young workers y at municipality m at time t , respectively. The variable ζ indicates the intercept. The variables η_{yt} and μ_{mt} denote year and month dummies, respectively.³³ The variables λ_m have the same interpretation as in regression (1) and the variable D_{mt} denotes a dummy

³¹For all young starting civil servants, approximately 11% leave within 1 year. Reasons for leaving are a large amount of bureaucracy. More than 50% of young workers indicates that this is their main reason to leave. This is followed by finding it difficult to climb the career ladder (Bekkers, 2020).

³²To do this, we use the aggregate command from package Stats in R to transform our dataset. This command allows us to sum the total amount of young employees per month and per municipality. This provides us with 2,352 observations (= 84 months [= 7 years] multiplied by 28 municipalities).

³³The main reason for creating year and month dummies separately is to prevent overfitting. More precisely, when including for each year–month combination a separate dummy, we would include 84 dummies (83 because of perfect multicollinearity). Now we only include 17 time dummies (6-year dummies and 11-month dummies), reducing our amount of independent variables by more than 80%.

²⁹Note, that despite our dataset ends at 2018, we still have data that indicates whether civil servants are still employed in January 2019. Therefore, we do not have to exclude December 2018 from our analysis.

³⁰All civil servants are defined as all civil servants born after 1950. In this way, we prevent that the FPU arrangement may affect the percentage of young workers employed in a particular month.

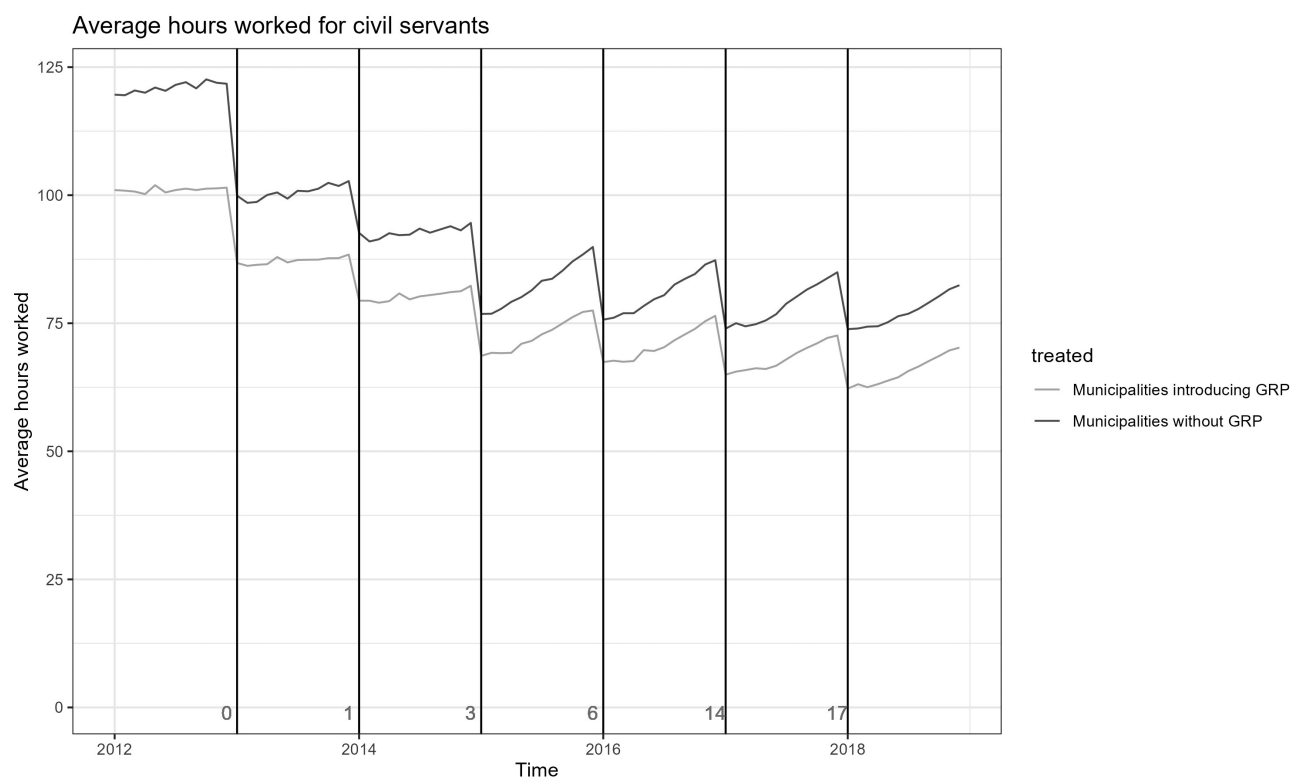


Figure 1. Average hours worked for civil servants (60+) for municipalities that did and did not adopt a GRP. The vertical lines accompanied by a number indicate how many municipalities adopted a GRP in that year or earlier (that means there was one municipality in 2014, there were three municipalities in 2015, etc.). *Note.* GRP = gradual retirement plan.

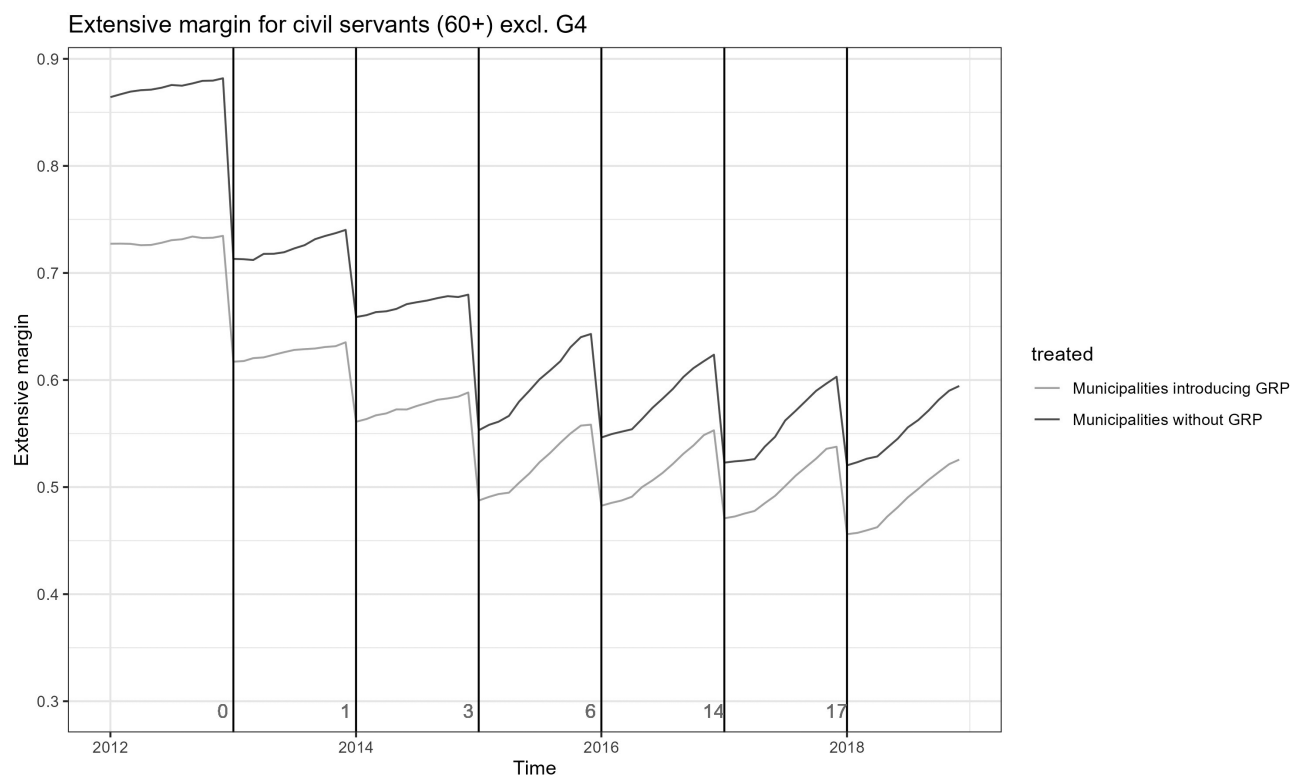


Figure 2. Extensive margin for older workers (60+) for municipalities with and without a GRP. *Note.* GRP = gradual retirement plan.

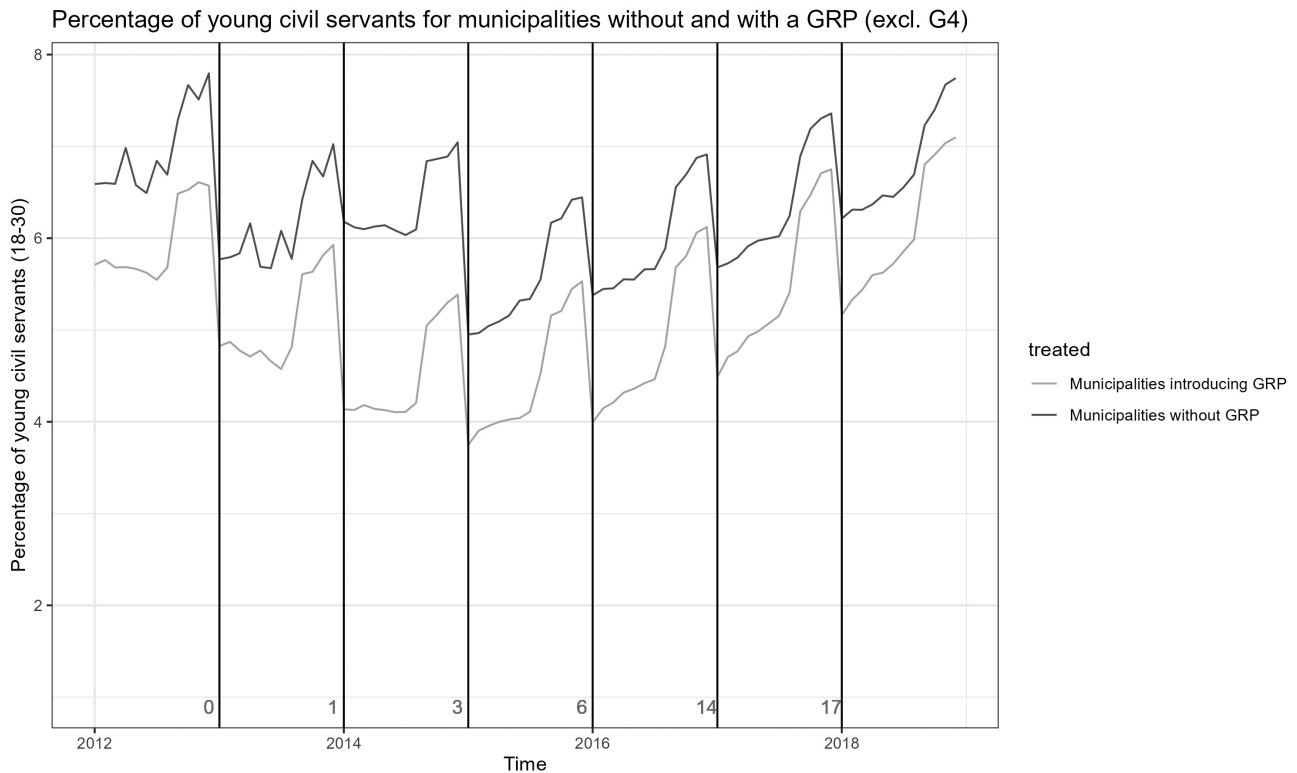


Figure 3. The number of young civil servants working at municipalities that did and did not adopt a GRP. The vertical lines accompanied by a number indicate how many municipalities adopted a GRP in that year or earlier (there was one municipality 2014, there were three municipalities in 2015, etc.). Note. GRP = gradual retirement plan.

variable whether municipality m at time t has implemented a GRP. If this is the case, the variable is equal to unity and otherwise it equals zero. This is our main coefficient of interest. As GRPs aim at making it possible for municipalities to increase the number of younger workers, we expect this coefficient to be positive. Lastly, ρ_{mt} denotes the error term.

RESULTS

We first analyze the effect of a GRP on monthly hours worked for older civil servants. We restrict our estimation to civil servants born after 1949. We do this to prevent any interference with attractive early retirement arrangements (FPU) for which older civil servants may still have been eligible (see Institutional framework). Second, we analyze the effect of GRPs on the participation (extensive margin) of older civil servants. We also perform this analysis for different wage income groups. Finally, we estimate the effect of GRPs on the hiring of young civil servants (18–30) and whether GRPs affect the wage growth of these younger workers.

Borusyak et al. (2021) indicate that it is necessary to check for heterogenous effect (i.e., whether effects differ per subgroup). Apart from the age-interaction terms, mentioned above, we as well check for differences between gender in Appendix IV.

Labor supply of older civil servants: total hours worked

We first analyze the number of monthly hours worked of older workers (age 60+), which is available on a monthly basis. Our

main coefficient of interest is the difference-in-differences estimator β_1 in regression (1) and the coefficient for the interaction of age and GRP. In case, a GRP increases (decreases) total labor supply, we expect these coefficients to be positive (negative) (see Descriptive statistics).

We observe that a GRP increases the number of monthly hours worked by 2.8–3.1 hr (see Table 3, columns 1 and 2). This increase is significant at the 1% level. In other words, civil servants that can enroll in a GRP work on average 2 hr more per month when compared with municipalities where a GRP is unavailable.³⁴ This equals roughly one full-time work week per year.³⁵

We compare the effect of GRPs at a particular age by adding interaction terms (column 3). We observe a significant negative baseline effect of nearly minus 4 hr per month. Moreover, we observe significantly positive interaction effects between the ages of 62 and 65. This size of this effects increases with age. At these ages, civil servants work significantly more hours per month when compared with the control group. For instance, at the age of 65 civil servants in the treatment group work on average $-3.9 + 16.8 = 12.9$ more hours per month when compared with civil servants who are not able to make use of a GRP.

In Table 4, we estimate which wage income group especially has an interest in GRPs. We calculate the hourly wage income by using the work history in the years 2010–2013. This allows us to define a low-, middle-, and high-wage income group based on the wage income boundaries of the

³⁴In Appendix IV, we show that the results of a GRP are not much different between male and female civil servants.

³⁵A full-time work week for civil servants working at municipalities is equal to 36 hr.

Table 3. The effect of adopting a GRP on the number of monthly hours worked for older civil servants.

Older civil servants (60+): total hours worked (month)			
	(1)	(2)	(3)
D_{imt}	3.133*** (0.864)	2.765*** (0.828)	-3.859*** (1.348)
$D_{imt} * age(61)$			0.024 (0.938)
$D_{imt} * age(62)$			4.579*** (1.342)
$D_{imt} * age(63)$			9.884*** (1.579)
$D_{imt} * age(64)$			13.298*** (1.747)
$D_{imt} * age(65)$			16.817*** (1.697)
Interaction terms	No	No	Yes
Controls	No	Yes	Yes
Age dummies	No	Yes	Yes
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Adj. R^2	8.8%	15.4%	15.5%
Civil servants	14,389	14,389	14,389

D_{imt} is the difference-in-difference estimator. The variable D_{imt} is a dummy variable equal to unity when an individual works at municipality m that has a GRP available in month t . Otherwise D_{imt} equals zero. Clustered standard errors at the civil servant level between parentheses. The age of 60 is the reference category. See [Appendix IV](#) for the full regression table. Note. GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

treatment group. The low-wage income group is the group with wages in the bottom 25% of the wage income distribution, and the highest wage income group are the wages in the top 25% of the wage income distribution.³⁶ In-between is the middle-wage income group. Based on these cutoffs, we divide the control group into the same wage income categories. Then we run regression (1) for different wage income groups. We present the results here with the number of monthly hours servants due to data limitations.

The effect of a GRP on monthly hours worked is overall positive for the low-, middle-, and high-wage income group (see [Table 4](#)). Using the results from [Table 4](#), it is possible to calculate the net effect of a GRP over the ages 60–65.³⁷ For the low-wage income group, we find a positive effect of 184.5 (115.8) hr over the years 60–65. For the middle- and high-wage income group these numbers are equal to 212.5*** (81.8) and 395.6*** (122.2) hr, respectively. So, we find a positive and significant effect for the middle- and high-wage income group that roughly corresponds to 6 and 11 full-time work weeks, respectively, over a period of 6 years. Calculating the weighted average for all wage income groups, we find that total labor supply increases with approximately 7 full-time work weeks on average.

³⁶This means that the salaries benchmark is at €19.70 and €30.65 per hour, respectively. Moreover, as not everyone worked already for the municipality in the period 2010–2013, we lose 6.5% of our observations.

³⁷To do so, we use the estimation results from column (3) regarding the baseline coefficient D_{imt} and the age-interaction terms. For example, for the low-wage income group the effect of a GRP at age 60 equals $1.906 * 12 = 22.9$ hr per year. For age 61, this is equal to $(1.906 + 0.411) * 12 = 27.8$ hr per year. Doing this for all ages and all wage income groups yield the results mentioned in the text. We use the delta method to calculate the corresponding standard error.

Labor supply of older civil servants: extensive margin

Having established that GRPs positively affect the labor supply of older individuals at the intensive margin, we now investigate the effect at the extensive margin. In particular, we are interested at which age civil servants leave the municipality. For the majority of civil servants this is equivalent to retirement.

We construct a dummy variable which is equal to one if the civil servant works at least 1 hr at the municipality of employment during a particular month. If this is not the case, this variable is equal to zero. We use the same independent variables as in [equation \(1\)](#) only now we estimate a linear probability model. If the D_{imt} coefficient is positive, it indicates that civil servants that are employed at a municipality with a GRP are more likely to remain active for a municipality with a GRP. In other words, a positive sign means a positive effect of GRPs on the retirement of older civil servants.

In the baseline regression without controls, the presence of a GRP positively and significantly affects the labor supply at the extensive margin by on average 4%-points ([Table 5](#)). Once we add control variables, this effect reduces to 3.7%-points.

Once we introduce interaction terms between age and the difference-in-differences estimator we find a positive significant effect of being employed at the ages of 62–65. More precisely, a GRP increases the probability of being employed at age 65 by $0.111 - 0.005 = 10.6\%$ -points. The introduction of GRPs do not have an extensive margin effect at the ages of 60 and 61.³⁸

³⁸In [Appendix IV](#), we show that the results of a GRP are not much different between male and female civil servants.

Table 4. The effect of adopting a GRP on monthly hours worked for different wage income groups of older civil servants.

Wage income group for older civil servants (60+): total hours worked (month)			
	(1)	(2)	(3)
	Low-wage income	Middle-wage income	High-wage income
D_{imt}	1.906 (2.789)	-7.487*** (1.912)	-5.790** (2.692)
$D_{imt} * age(61)$	0.411 (2.023)	0.113 (1.315)	0.481 (1.809)
$D_{imt} * age(62)$	2.244 (2.889)	5.632*** (1.883)	7.056*** (2.648)
$D_{imt} * age(63)$	1.618 (3.231)	13.715*** (2.252)	13.724*** (3.187)
$D_{imt} * age(64)$	-1.344 (3.464)	20.186*** (2.513)	18.621*** (3.557)
$D_{imt} * age(65)$	1.010 (3.372)	22.986*** (2.420)	27.825*** (3.469)
Interaction terms	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Adj. R^2	18.7%	15.4%	15.5%
Civil servants	3,719	6,484	3,253

D_{imt} is the difference-in-difference estimator. The variable D_{imt} is a dummy variable equal to unity when an individual works at municipality m that has a GRP available in month t . Otherwise D_{imt} equals zero. Clustered standard errors at the civil servant level between parentheses. Age 60 is the reference category in the above regression. See [Appendix IV](#) for the full regression table. *Note.* GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

Table 5. The effect of adopting a GRP on being employed (extensive margin).

Older civil servants (60+): extensive margin			
	(1)	(2)	(3)
D_{imt}	0.040*** (0.006)	0.037*** (0.006)	-0.005 (0.009)
$D_{imt} * age(61)$			-0.001 (0.006)
$D_{imt} * age(62)$			0.028*** (0.009)
$D_{imt} * age(63)$			0.063*** (0.011)
$D_{imt} * age(64)$			0.087*** (0.012)
$D_{imt} * age(65)$			0.111*** (0.012)
Interaction terms	No	No	Yes
Controls	No	Yes	Yes
Age dummies	No	Yes	Yes
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Adj. R^2	8.8%	15.4%	15.5%
Civil servants	14,389	14,389	14,389

D_{imt} is the difference-in-difference estimator. The variable D_{imt} is a dummy variable equal to unity when an individual works at municipality m that has a GRP available in month t . Otherwise D_{imt} equals zero. Clustered standard errors at the civil servant level between parentheses. Age 60 is the reference category in the above regression. See [Appendix IV](#) for the full regression table. *Note.* GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

Table 6. The effect of adopting a GRP on being employed (extensive margin) for different wage income groups of older civil servants.

Older civil servants (60+): extensive margin per wage income group			
	(1)	(2)	(3)
	Low-wage income	Middle-wage income	High-wage income
D_{imt}	0.013 (0.020)	-0.025* (0.013)	-0.014 (0.017)
$D_{imt} * age(61)$	0.008 (0.014)	0.001 (0.009)	-0.004 (0.012)
$D_{imt} * age(62)$	0.015 (0.021)	0.037*** (0.013)	0.038** (0.017)
$D_{imt} * age(63)$	0.017 (0.023)	0.087*** (0.015)	0.083*** (0.021)
$D_{imt} * age(64)$	0.005 (0.025)	0.129*** (0.017)	0.112*** (0.024)
$D_{imt} * age(65)$	0.031 (0.025)	0.147*** (0.017)	0.169*** (0.023)
Interaction terms	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Adj. R^2	19.2%	15.6%	18.3%
Civil servants	3,719	6,484	3,253

D_{imt} is the difference-in-difference estimator. The variable D_{imt} is a dummy variable equal to unity when an individual works at municipality m that has a GRP available in month t . Otherwise D_{imt} equals zero. Clustered standard errors at the civil servant level between parentheses. Age 60 is the reference category in the above regression. See [Appendix IV](#) for the full regression table. *Note.* GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

We run the same regression for different wage income groups as we did in the previous section (see [Table 6](#)). We observe that a GRP has a positive effect on the labor force participation of the middle- and high-wage income group. We find positive and significant age-interaction effects effect at the ages 62–65. Moreover, the effect is stronger at higher ages. For instance, for the middle-wage income group we find a positive effect at age 62 that equals 1.2%-points, while at age 65 this equals 12.2%-points. The same holds as well for the high-wage income group. Thus, the availability of a GRP increases the labor force participation at the extensive margin mainly at higher ages.

Hiring decision of young civil servants

[Table 7](#) provides us with the difference-in-differences estimator for [equation \(2\)](#). Next to the percentage of young workers, we as well ran a regression with the natural logarithm of young workers as our dependent variable. We observe that for the entire group 18–30 the estimator is positive, yet insignificant at the 5% level. The difference-in-differences estimator is insignificant for both dependent variables. In other words, the introduction of GRPs seems not to have a positive and significant effect on the hiring rate of young workers.

Lastly, it is as well possible to analyze the wage growth of young civil servants. A faster wage growth of young civil servants may indicate that they are able to climb the career ladder faster and end up in better paying jobs. Therefore, it is interesting to analyze how the introduction of GRPs affect the

Table 7. The effect of adopting a GRP on the number of younger workers hired.

	Age group (18–30)	
	Log (young civil servants)	% of young civil servants
D_{mt}	0.011 (0.076)	-0.114 (0.301)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Adj. R^2	81.6%	72.7%
Number of observations	2,352	2,352

D_{mt} is the difference-in-difference estimator. The variable D_{mt} is a dummy variable equal to unity when municipality m has a GRP available in month t . Otherwise D_{mt} equals zero. Clustered standard errors at the municipality level between parentheses. *Note.* GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

career opportunities of young civil servants. We construct the wage growth as a variable that is equal to the current wage at time t divided by the wage of that same civil servant at time $t - 12$ (that is, the wage 1 year ago). For instance, we divide the wage individual i at municipality m earned in January 2017 by the wage he earned in January 2016.³⁹ We plot the average

³⁹We drop young workers whose are at the top and bottom 5% of the wage growth distribution to prevent that outliers have an effect on our estimation.

Table 8. Wage growth for young civil servants.

	Age group (18–30)	
D_{imt}	–0.009*** (0.003)	–0.008*** (0.003)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Controls	No	Yes
Adj. R^2	12.4%	13.2%
Number of civil servants	5,387	5,387

D_{imt} is the difference-in-difference estimator. The variable D_{imt} is a dummy variable equal to unity when an individual works at municipality m that has a GRP available in month t . Otherwise D_{imt} equals zero. Clustered standard errors at the civil servant level between parentheses. *Note.* GRP = gradual retirement plan.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

wage growth for young civil servants (see [Appendix III](#)) and we run the same regression as in [equation \(1\)](#) with our dependent variable now equal to the wage growth of young civil servants. We only focus on young civil servants that remain employed by the same municipality.⁴⁰ We assume that young civil servants that stay are most likely the ones that are the most capable in their job and have the highest chance of climbing the career ladder faster. As a result, this means that the interpretation of the above regression is can be interpreted as an upper bound for the wage growth of young civil servants caused by the introduction of GRPs.

The results are displayed in [Table 8](#). We observe that there is a negative significant effect of GRPs on the wage growth for young civil servants. This effect remains the same when adding control variables. The effect, however, is rather small. As an example, suppose a civil servant in the control group earns a monthly income of €2,000, gross in this year and the year thereafter. According to the regression results that same person in the treatment group would earn on average €16, less compared with someone in the control group. Therefore, the effect is of little economic relevance.

DISCUSSION AND CONCLUSION

We analyzed the employment effects of GRPs in municipalities with more than 100,000 citizens. We compared hours worked and net participation of older civil servants in municipalities with and without a GRP. As our time span includes the introduction of GRPs, we were able to estimate a difference-in-differences specification.

We found that GRPs increase the labor force participation of older workers. These effects are particularly strong at higher ages. When analyzing the effect of GRPs on total labor supply for different wage income groups, we found that the total hours worked for the middle- and high-wage income groups *increased* between the ages 60–65. Those effects are approximately equal to 6 and 11 full-time work weeks. For the low-wage income group we did not find a significant effect.

These results are partially in line with [Montizaan et al. \(2010\)](#) who find in their stated preferences analysis that

financial incentives (change in the accrual rate and pension income) have a positive and significant effect on the final retirement age. They also find that the total amount of hours worked decreases at younger ages once GRPs become available. However, they find that total labor supply decreases once gradual retirement schemes are introduced while we find an increase, particularly for middle- and high-wage income workers. The difference between our results could be explained by the very strong financial incentives in GRPs. These financial incentives are stronger than the ones in [Montizaan et al. \(2010\)](#). Therefore, this may indicate that if financial incentives become particularly strong, total labor supply becomes positive.

Regarding the hiring decision of young civil servants, we observe that both treated and nontreated municipalities see an increase in the number of young civil servants over time. GRPs do not seem to have an impact on youth hirings by municipalities. This may indicate that young and old civil servants are imperfect substitutes. Apart from job experience, differences in education could explain this. Unfortunately, it is not possible to compare education levels and specializations between old and young civil servants due to data limitations.

In addition, an interesting follow-up question would be to analyze how GRPs affect the labor supply of workers in the age category 50–60. This may indicate whether GRPs have positive spillovers effect on (for instance) the wage growth of more similar workers. This is a question for further research.

Lastly, there are two reasons why we should be cautious with the interpretation of our results. The first reason concerns external validity. Our results are limited to the public sector. Further research should investigate the outcomes of GRPs or alternative policies in other sectors of industry. It would then also be interesting to look at labor supply effects in the longer term. If social norms change endogenously, then the effects could become larger over time.

Second, the main assumption of our difference-in-differences analysis is that treatment and control group are similar prior to the introduction of GRPs. Although we have checked several aspects to make sure that endogenous adoption does not play a role, we cannot fully rule out that municipalities that attach greater value to older civil servants (in their overall HR strategy) are more likely to introduce a GRP. If this is the case, then we most likely overestimate the results of GRPs and our estimated effects imply an upper

⁴⁰In case, we include young civil servants that leave the municipality the results do not change in terms of sign, significance, or magnitude.

bound. Further (survey or interview based) research could reveal whether this is the case.

SUPPLEMENTARY MATERIAL

Supplementary material is available online at *Work, Aging, and Retirement*.

ACKNOWLEDGMENTS

We would like to thank Arthur van Soest, Emanuele Dicarolo, and Pilar Garcia Gomez for being discussant of this paper during several conferences. We also would like to thank all participants at the Netspar Pension Day, Netspar International Pension Workshop, GSS seminar (Tilburg University), RGS conference, and the seminar at the Université Libre de Bruxelles. All remaining errors are our own. Conflicts of Interests: All authors declare that they have no conflicts of interest.

FUNDING

This research was funded by Institute Gak. Institute Gak contributes to the quality of social security and the labor market in the Netherlands by investing in social projects and academic research.

REFERENCES

- A&O fonds Gemeenten. (2020, September 29). *Toolkit Generatiepact*. Vraag en antwoord—argumentatie generatiepact. Retrieved from https://www.aeno.nl/uploads/AO_gemeenten_GP_Vraag-en-antwoord—argumentatie-GP.pdf
- A+O fonds Gemeenten. (2014). *Personeelsmonitor Gemeenten*. Stichting A+O fonds Gemeenten.
- A+O fonds Gemeenten. (2015, September 7). *Generatiepact Deventer*. Deventer.
- A+O fonds Gemeenten. (2016). *Generatiepact Enschede*. Enschede.
- A+O fonds Gemeenten. (2018). *Personeelsmonitor Gemeenten 2017*. A+O fonds Gemeenten.
- Albanese, A., Cockx, B., & Thuy, Y. (2020). Working time reductions at the end of the career: Do they prolong the time spent in employment? *Empirical Economics*, 59(1), 99–141. <https://doi.org/10.1007/s00181-019-01676-7>
- Alphen aan den Rijn. (2017, May 1). *Regeling Generatiepact Alphen aan den Rijn*. Alphen aan den Rijn.
- Ambtenarensalaris.nl. (2020). *Wat is de werkbonus*. Retrieved October 19, 2020, from <https://ambtenarensalaris.nl/kennisbank/algemeen/wat-is-de-werkbonus/>
- Atav, T., Jongen, E., & Rabaté, S. (2021). *Increasing the effective retirement age: Key factors and interaction effects* (IZA Discussion Paper No. 14150). <http://dx.doi.org/10.2139/ssrn.3798903>
- Behagel, L., & Blau, D. M. (2012). Framing social security reform: Behavioral responses to changes in the full retirement age. *American Economic Journal: Economic Policy*, 4(4), 41–67. <https://doi.org/10.1257/pol.4.4.41>
- Bekkers, H. (2019, June 19). *Gemiddelde leeftijd ambtenaar daalt*. Binnenlands Bestuur. Retrieved from <https://www.binnenlandsbestuur.nl/ambtenaar-en-carriere/nieuws/gemiddelde-leeftijd-ambtenaar-daalt.9929846.lynx>
- Bekkers, H. (2020). *Jonge ambtenaar haakt af vanwege bureaucratie*. Binnenlands Bestuur. Retrieved October 20, 2020, from <https://www.binnenlandsbestuur.nl/carriere/ambtenaren-jong-erin-jong-eruit>
- Bertoni, M., & Brunello, G. (2021). Does a higher retirement age reduce youth employment? *Economic Policy*, 36(106), 325–372. <https://doi.org/10.1093/epolic/eiaa022>
- Boeri, T., Garibaldi, P., & Moen, E. (2016). *A clash of generations? Increase in retirement age and labor demand for youth* (No. 11422) (CEPR Discussion Paper No. DP11422). Available at SSRN <https://ssrn.com/abstract=2820077>
- Bolhaar, J., Dillingh, R., & van Vuuren, D. (2017). *Langer doorwerken: keuzes voor nu en later*. CBP Policy Brief in samenwerking met Netspar (10).
- Börsch-Supan, A., Bucher-Koenen, T., Kutlu-Koc, V., & Goll, N. (2018). Dangerous flexibility—retirement reforms reconsidered. *Economic Policy*, 33(94), 315–355. <https://doi.org/10.1093/epolic/eiy002>
- Borusyak, K., Jaravel, X., & Spiess, J. (2021). Revisiting event study designs: Robust and efficient estimation, arXiv, <https://doi.org/10.48550/arXiv.2108.12419>, preprint: not peer reviewed.
- Carta, F. D., & Von Wachter, T. M. (2021). *Workforce aging, pension reforms, and firm outcomes* (No. w28407). National Bureau of Economic Research. <https://doi.org/10.3386/w28407>
- Coile, C. C., & Levine, P. B. (2011). Recessions, retirement, and social security. *American Economic Review*, 101(3), 23–28. <https://doi.org/10.1257/aer.101.3.23>
- Damman, M., & van Solinge, H. (2017). *De combinatie van betaald en onbetaald werk in de jaren voor pensioen* (Netspar Industry Paper Series, Design Paper 69).
- de Pijper, B., Wildenburg, A., Montessori, R., van de Graaf, M., de Jong, M., van der Zanden, R., Ramaekers, G., van de Brock, H., Huitema, J. (2019). *De kleine Gids voor de Nederlandse Sociale Zekerheid*. In 3.7 Re-integratie door de gemeente (pp. 211–214). Woltes Kluwer.
- de Vos, K., Kapteyn, A., & Kalwij, A. (2018). *Social security programs and employment at older ages in the Netherlands*. National Bureau of Economic Research. <https://doi.org/10.3386/w25250>
- Doove, S., ter Haar, D., Schalken, N., & Span, T. (2019). *Inkomens- en arbeidsmarktpositie van de jongere partners van AOW-gerechtigden*. Den Haag.
- Elsayed, A., de Grip, A., Fouarge, D., & Montizaan, R. (2018). Gradual retirement, financial incentives, and labour supply of older workers: Evidence from a stated preference analysis. *Journal of Economic Behavior & Organization*, 150, 277–294. <https://doi.org/10.1016/j.jebo.2018.01.012>
- Euwals, R., Knoef, M., & Van Vuuren, D. (2011). The trend in female labour force participation: What can be expected in the future? *Empirical Economics*, 40(3), 729–753. <https://doi.org/10.1007/s00181-010-0364-9>
- Euwals, R., Van Vuuren, D., & Wolthoff, R. (2010). Early retirement behaviour in the Netherlands: Evidence from a policy reform. *De Economist*, 158(3), 209–236. <https://doi.org/10.1007/s10645-010-9139-0>
- FNV. (n.d.). *Gezond en vast werk met generatiepact Eerlijk verdelen tussen jong en oud*. Retrieved October 19, 2020, from <https://www.fnv.nl/acties/generatiepact>
- Gemeente Alkmaar. (2018, January 4). *Regeling Generatiepact*. Alkmaar.
- Gemeente Amersfoort. (2017, July 26). *Wijziging van de Arbeidsvoorwaardenregeling Gemeente Amersfoort (ARGA) betreffende invoering van de Regeling Generatiepact Gemeente Amersfoort 2017*. Amersfoort.
- Gemeente Delft. (2016, August 19). *Regeling 60-80-100 en Regeling 80-90-100*. Delft.
- Gemeente Den Haag. (2015, September 1). *Regeling Generatiepact 2015 Den Haag*. Den Haag.
- Gemeente Eindhoven. (2017, February 7). *Raadsinformatiebrief. Onderwerp: regeling Generatiepact*. Eindhoven.
- Gemeente Emmen. (n.d.). *Generatiepact Emmen*. Emmen.
- Gemeente Groningen. (2013, December 17). *Sociaal Statuut gemeente Groningen 2014–2018*. Groningen.
- Gemeente Haarlem. (2017, March 28). *Invoeren Regeling Generatiepact Haarlem 2017*. Haarlem.
- Gemeente Haarlem. (2018). *Regeling Generatiepact Haarlem 2018–2021*. Haarlem.

- Gemeente Haarlemmermeer. (2019, January 29). *Raadsvoorstel. Kadernota 2020 van de Gemeenschappelijke Regeling Cocensus*. Haarlemmermeer.
- Gemeente Leeuwarden. (2016, March 15). *Regeling Generatiepact*. Leeuwarden.
- Gemeente Leiden. (2018, February 1). *Gemeente Leiden—Regeling minder werken gemeente Leiden*. Leiden.
- Gemeente Nijmegen. (2017, July 11). *Regeling Generatiepact gemeente Nijmegen*. Nijmegen.
- Gemeente Tilburg. (2018, August 16). *Regeling generatiepact gemeente Tilburg*. Tilburg.
- Gemeente Utrecht. (2015, November 1). *Generatiepact gemeente Utrecht*. Utrecht.
- Gemeente Westland. (2016, September 16). *Gemeente Westland creëert banen voor jongeren*. Westlanders.nu. Retrieved from <https://m.westlanders.nu/gemeentenieuws/gemeente-westland-creëert-banen-voor-jongeren-19178/>
- Gemeente Zwolle. (2015, March 25). *Generatiepact 2015–2017*. Zwolle.
- Gemeente Zwolle. (n.d.). *Generatiepact 2017–2021*. Zwolle.
- Gielen, A. C. (2009). Working hours flexibility and older workers' labor supply. *Oxford Economic Papers*, 61(2), 240–274. <https://doi.org/10.1093/oeq/gpn035>
- Goldin, C., & Katz, L. (2007). *Long-run changes in the US wage structure: Narrowing, widening, polarizing* (No. w13568). National Bureau of Economic Research. <https://doi.org/10.3386/w13568>
- Gruber, J., & Wise, D. A. (2010). *Social security programs and retirement around the world: The relationship to youth employment*. University of Chicago Press.
- Hernæs, E., Jia, Z., Piggott, J., & Vigtel, T. C. (2020). *Work less but stay longer—Mature worker response to a flexibility reform*. <http://hdl.handle.net/10419/249127>
- Hofäcker D., Hess M., & König, S. (Eds.) (2016). *Delaying retirement: Progress and challenges of active ageing in Europe, the United States and Japan*. Palgrave Macmillan.
- Kalwij, A., Kapteyn, A., & De Vos, K. (2010). Retirement of older workers and employment of the young. *De Economist*, 158(4), 341–359. <https://doi.org/10.1007/s10645-010-9148-z>
- Kantarci, T., & Van Soest, A. (2008). Gradual retirement: Preferences and limitations. *De Economist*, 156(2), 113–144. <https://doi.org/10.1007/s10645-008-9086-1>
- Kapteyn, A., de Vos, K., & Kalwij, A. (2010). Early retirement and employment of the young in the Netherlands In J. Gruber & D. Wise (Eds.), *Social security programs and retirement around the world: The relationship to youth employment*. University of Chicago Press.
- Kiesraad. (2013, November 13). *Databank Verkiezingsuitslagen*. Gemeenteraad. Retrieved from <https://www.verkiezingsuitslagen.nl/verkiezingen/detail/GR20131113>
- Kiesraad. (2014, November 19). *Databank Verkiezingsuitslagen*. Gemeenteraad. Retrieved from <https://www.verkiezingsuitslagen.nl/verkiezingen/detail/GR20141119>
- Kiesraad. (2014, March 19). *Databank Verkiezingsuitslagen*. Gemeenteraad. Retrieved from <https://www.verkiezingsuitslagen.nl/verkiezingen/detail/GR20140319/630222>
- Lahey, J. (2008). Age, women, and hiring: An experimental study. *Journal of Human Resources*, 43(1), 30–56. <http://jhr.uwpress.org/>
- Machado, C. S., & Portela, M. (2014). Hours of work and retirement behaviour. *IZA Journal of European Labor Studies*, 3(1), 1–22. <https://doi.org/10.1186/2193-9012-3-16>
- Ministry of Internal Affairs. (2019, February 14). *Beantwoording kamervragen van het lid Özütok*. Den Haag.
- Mohnen, P. (2019). *The impact of the retirement slowdown on the US youth labor market*. (Working Paper). <https://doi.org/10.1086/725874>
- Montzaan, R., Cörvers, F., & De Grip, A. (2010). The effects of pension rights and retirement age on training participation: Evidence from a natural experiment. *Labour Economics*, 17(1), 240–247. <https://doi.org/10.1016/j.labeco.2009.10.004>
- Niemeijer, W. (2017). *Wie pakt het Generatiepact? Een onderzoek naar de adoptie van het Generatiepact onder zes Nederlandse gemeenten* [MSc thesis]. Erasmus Universiteit Rotterdam.
- OECD. (2011). *Pensions at a Glance 2011: Retirement-income systems in OECD and G20 countries*. OECD Publishing. https://doi.org/10.1787/pension_glance-2011-en
- Oude Mulders, J., & Henkens, K. (2019). Employers' adjustment to longer working lives. *Innovation in Aging*, 3(1), igy040. <https://doi.org/10.1093/geroni/igy040>
- Oude Mulders, J., Henkens, K., & van Dalen, H. P. (2020). How do employers respond to an aging workforce? Evidence from surveys among employers, 2009–2017. In S. J. Czaja, J. Sharit, and J. B. James (Eds.), *Current and emerging trends in aging and work* (pp. 281–296). Springer International Publishing. https://doi.org/10.1007/978-3-030-24135-3_14
- Picchio, M., & Van Ours, J. (2013). Retaining through training even for older workers. *Economics of Education Review*, 32, 29–48. <https://doi.org/10.1016/j.econedurev.2012.08.004>
- Rijksoverheid. (n.d.). *Beschut werk voor mensen met een arbeidsbeperking*. Retrieved February 13, 2021, from <https://www.rijksoverheid.nl/onderwerpen/werken-met-arbeidsbeperking/beschut-werk-voor-mensen-met-arbeidsbeperking>
- Rijksoverheid. (s.d.). *Loonkostenvoordelen (LKV)*. Retrieved October 19, 2020, from <https://www.rijksoverheid.nl/onderwerpen/wet-tegemoetkomingen-loondomein-wtl/tegemoetkoming-loonkosten-oudere-jongere-of-gehandicapte-werknemers/loonkostenvoordelen-lkv>
- Schippers, J. J., & Vlasblom, J. D. (2019). Werkloze ouderen weer aan het werk? Het effect van reserveringsloos en zoekintensiteit. *Tijdschrift voor Arbeidsvraagstukken*, 35(1), 6–25. <https://doi.org/10.5117/2019.035.001.002>
- Statistics Netherlands (CBS). (s.d.). *CBS microdata*.
- Van Dalen, H., & Henkens, C. (2019). *Gaat het generatiepact zijn doel bereiken? Me Judice*. <http://www.mejudice.nl/artikelen/detail/gaat-het-generatiepact-zijn-doel-bereiken>
- Van Soest, A., & Vonkova, H. (2014). How sensitive are retirement decisions to financial incentives? A stated preference analysis. *Journal of Applied Econometrics*, 29(2), 246–264. <https://doi.org/10.1002/jae.2313>
- Van Solinge, H., Vanajan, A., & Henkens, K. (2023). Does phased retirement increase vitality in older workers? Findings from a 3 year follow up panel study. *Journal of Aging & Social Policy*, 35(2), 221–240. <https://doi.org/10.1080/08959420.2022.2029270>
- Verkooijen, L. (2017). *Arbeidsparticipatie ouderen flink gestegen*. Centraal Bureau voor de Statistiek.
- Vestad, O. L. (2013). *Early retirement and youth employment in Norway*. Statistics Norway.
- Veth, K., & Van Vuuren, T. (2020). De impact van het Generatiepact Vijf casestudies over ervaringen en gevolgen voor de duurzame inzetbaarheid. *Tijdschrift voor HRM*, 23(3), 21–39. <https://doi.org/10.5117/THRM2020.3.VUUR>
- Walstra, E. (2017, September 12). *Niveau ambtenaren stijgt*. Binnenlands Bestuur. Retrieved from <https://www.binnenlandsbestuur.nl/ambtenaar-en-carriere/nieuws/niveau-ambtenaren-stijgt.9570875.lynkx>
- Weir, D. (2007). Are baby boomers living well longer. In B. Madrian, O. S. Mitchell, and B. J. Soldo (Eds.), *Redefining retirement: How will boomers fare* (pp. 95–111). Oxford. <https://doi.org/10.1093/acprof:oso/978019923s0778.003.0005>