Sick of work? The effect of work time reduction on the sickness absenteeism of teachers

Edwin Leuven*

Universiteit van Amsterdam and *CREST-INSEE*

Abstract

This paper investigates how a policy that is aimed to increase the labor force attachment of older teachers affects their labor supply and absenteeism. The policy allows teachers older than 52 to reduce their working hours by 10% at the cost of a 3.5% salary reduction. When teachers turn 56 they can reduce their work load by another 10% at the same cost. This measure therefore introduces a change in teachers budget constraints the moment they turn 52 respectively 56. This paper uses cross-sectional and longitudinal variation to assess the effect of this policy on teachers labor supply and the subsequent effect on absenteeism.

Keywords: Absenteeism, labor supply, teachers, policy evaluation.
JEL codes: J22, J45, I20

1 Introduction

Teachers are a crucial input in educational production. This is true in terms of spending: between 60 to 80 per cent of education spending is accounted for by personnel cost. In addition, there is substantial evidence that teacher quality is a key factor in explaining student outcomes. While 'teacher effects' are important, teacher quality has proven to be an evasive concept. Variation in teacher education and experience, two readily observed quality measures which are also the major determinants of teacher salaries, explain only little of the variation in student outcomes (see Hanushek (2002) for a review of these and many other related issues).

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It is therefore surprising that teacher absence as a measure of teacher quality has received relatively little attention in the literature.

This paper considers the sickness absenteeism of teachers. The absence of teachers from the classroom is costly to the extent that pupils learn less during their absence and their absence has negative spillovers within the school. Pupil learning may suffer because replacements are less qualified or experienced, the absence can disrupt daily rhythm and have adverse effects on student motivation. There is also an organisational cost to the extent that school principals have to find replacements. Finally, having sick colleagues may negatively affect morale.

There is a small literature that considers the absenteeism of teachers. These studies focus on the effect of financial incentives (sick-leave policy) on teacher absence. Winkler (1980) for example uses school level data for 57 schools in Wisconsin and California. He looks at the effect of incentives on sickness absenteeism and finds that absenteeism is lower when teachers have to report their absence with the school principal. Absenteeism is also lower when teachers need a sickness statement from their doctor. Jacobson (1989) looks how a bonus incentive scheme affects the absenteeism of teachers in a New York school district. He finds that the scheme lowers absenteeism, and that part of this decrease is matched by a higher uptake of personal holidays. Finally, Ehrenberg et al. (1989) find that absenteeism decreases when teachers can accumulate unused leave, which subsequently can be cashed in at retirement. These studies show that financial incentives may be effective devices to lower absenteeism.

The focus of this paper is not on direct financial incentives, but rather on the interaction between teachers' labor supply and their sickness absenteeism. More in particular, this paper investigates how a policy that is aimed to increase the labor force attachment of older teachers affects their labor supply and absenteeism.

Like in many other countries, absenteeism is relatively high among school teachers in the Netherlands. In recent years 8% of the working days is lost because teachers report sick. Not only is absenteeism high, it becomes even higher amongst older teachers for whom more than 15% of their contract time is lost because of sickness. The policy under consideration allows teachers older than 52 to reduce their working hours by 10% at the cost of a 3.5% salary reduction. When teachers turn 56 they can reduce their work load by another 10% at the same cost. This measure therefore introduces a change in teachers budget constraints the moment they turn 52 respectively 56. This paper uses cross-sectional and longitudinal variation to assess the effect of this policy on teachers' labor supply and the subsequent

effect of both the policy and working time on absenteeism.

The paper proceeds as follows. The next section provides the details of the policy. Section 3 then introduces the administrative data on which this paper builds, then followed by section 4 where the empirical strategy is outlined. Section 5 then presents the results of the estimations and section 6 concludes.

2 Details of the work time reduction policy

To address the high absenteeism among older teachers the Dutch education authorities have put into place a policy that is aimed at lowering sickness absenteeism, and reducing the inflow of long-term sick into the national disability scheme. The idea behind the policy is to reduce working pressure through subsidized work time reduction (WTR). The policy is referred to as BAPO, a Dutch acronym which stands for "improving work participation elderly".

In the Netherlands more than 99% of primary and secondary education is publicly funded. As a consequence, basically all primary and secondary school teachers in the Netherlands are remunerated following the same collective labor agreement. This agreement defines subsidized work time reduction as a right. Subsidized work time reduction for older teachers was introduced in 1994. A teacher qualifies for subsidized leave if he is i) 52 or older, and ii) has been employed as a teacher for at least five years previous to the requested starting date. Teachers can start their leave on the first month after they reach the age of 52. The teacher has to request the leave at least three months in advance.[1]

For a full-time teacher aged 52 to 56 the maximum amount of leave amounts up to 170 hours (10% of the total working time), and from 56 years onward 340 hours (20% of the total working time). The work time reduction reduces the average maximum teaching load per week by 3 respectively 6 hours. The amount of leave in any given school year must be at least a large as in the previous school year. The amount of used leave can be changed August 1 every year and teachers can take up less than the maximum amount of leave. Finally, the amount of leave cannot be bigger than 50% of the contracted working time.

A teacher who qualifies for leave can decide to postpone and accumulate this leave. Once a teacher decides to postpone leave, he must to so for the whole school year, unless he is 56 or older. Teachers older than 56 can take up to half of their total

[1]The employer has the possibility to delay the leave but not beyond the start of the next school year which means not longer than a year.

(saved) leave in any given school year, while the other half then must be postponed. The degree to which older teachers can use their saved leave, over and above the 170 respectively 340 hours mentioned above, is up to the discretion of the school. If a teacher decides to retire at age 61 or 62, he or she receives an additional 170 hours and can allocate the total reduction until the moment of retirement as long as it is non-decreasing and does not amount to more than 50% of the contracted working time.

Of the work time reduction, 35% is payed by the employee. From January 1, 2000 employees contribute 20% of the cost. Teachers pay for their leave the moment they use it. Use of the work time reduction scheme does not affect pension accumulation and other social insurances that apply to contract of the teacher.

To illustrate the workings of the policy (ignoring the saving aspect of the policy, and taxes) consider the standard budget restriction $C + wL = Y + wT$, where C is consumption, L is leisure, Y non-labor income, T the total time endowment and w is the wage rate. Given the initial labor supply of the teacher, l^*, it can be seen that the work time reduction policy changes the budget constraint an individual faces to

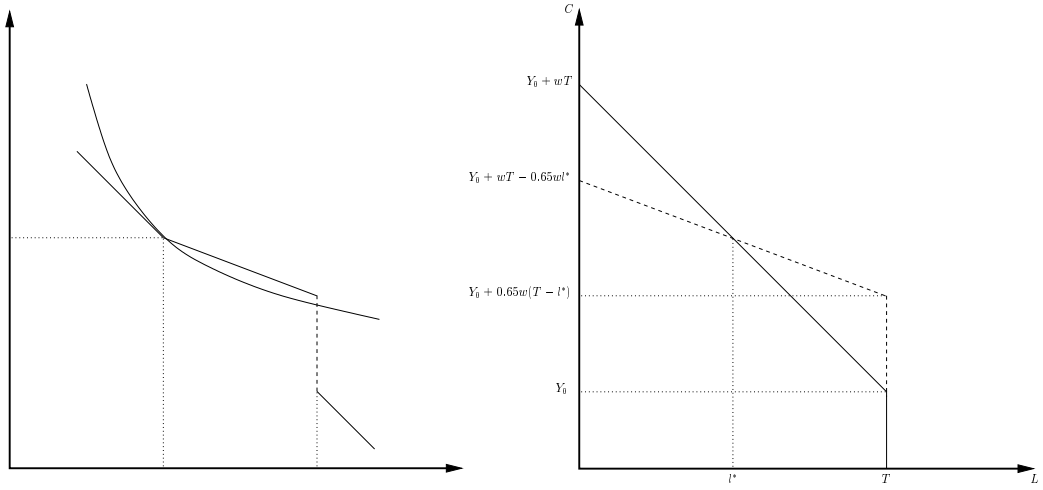
$$C + \beta wL = Y + wT - (1-\beta)wl^* \tag{1}$$

when $l^* \leq L \leq 0.9l^*$. Where $\beta = 0.35$ in 1999 and $\beta = 0.20$ from 2000 onwards. The workings of the policy are illustrated in Figure 1. This shows that the policy has both a substitution and an income effect that work in the same direction to reduce hours worked.

2.1 Sick-leave arrangements

When sick, teachers in the Netherlands continue to receive their full salary during their absence. If their sickness extends beyond 18 months, the amount of money they receive is reduced to 80% of their salary. After an uninterrupted absence of 24 months because of health reasons teachers can end up in the national disability scheme (WAO). Although teachers face little direct financial incentives not to report sick, there is a system where their absence is monitored. First, for short term absences they run the risk of being visited at home by a doctor. For longer term absences they will need to consult a doctor who will need to diagnose the health problem that prevents them from attending work. In addition social and school pressure can increase the cost of absenteeism for teachers.

In the years that the data cover, schools were required to participate in an in-



(a) Initial optimum

(b) Budget constraint details

Figure 1: The policy

surance fund from which the cost of the absenteeism was payed. Contributions to the fund were based on an experience rating scheme. The contribution was based on the amount declared for substitute teachers during the months September to November of the prior year, a sum which was then annualized. The contribution to the fund remained unchanged when schools declared less than 115% of their contribution. Schools therefore had an incentive to keep absenteeism low because (in the median and long run) they financed absenteeism through their contributions to the sickness fund.

3 Data

The data used in this paper are files from the personnel administration of the Dutch government for the years 1999 to 2002, and cover basically all primary and secondary school teachers in the Netherlands. For the analysis the data, which consist of spells, are converted to an annual panel, with variables referring to the calendar year.

These administrative data record the employment contracts of teachers. Contracts have a start date and, if it is terminated within the observation period, an end date. Attached to the contract is a so-called “work time factor” which is the

Table 1: Descriptive statistics

	All	Age=50-60
Age (years)	42.4	54.0
Female	0.661	0.510
Temporary Contract	0.186	0.071
(# hours)/(# hours full-time)	0.760	0.807
Days worked in year	314.0	336.0
Monthly wage	2660.0	3098.2
Monthly income	1928.3	2424.7
Primary Education	0.635	0.539
Denomination		
- Public	0.315	0.322
- Catholic	0.294	0.301
- Protestant	0.260	0.231
- Other private	0.132	0.147
Fraction of pupils with migrant parents		
- 0	0.220	0.198
- 0-50	0.263	0.267
- 50-70	0.200	0.204
- 70-100	0.147	0.144
- 100	0.080	0.074
- Unknown	0.090	0.113
Urban Area Index		
- 1 (Big City)	0.352	0.309
- 2	0.305	0.316
- 3	0.192	0.214
- 4	0.109	0.117
- 5 (Rural)	0.037	0.037
Nr observations	708807	192911

number of hours a teacher works relative to full-time.[2] The data also record the amount by which, if at all, a teacher makes use of subsidized work time reduction. Contracts specify a salary scale and the step within the scale. Since all teachers in the data are remunerated according to the same collective bargaining scales, the information from the contract allows us to look up the wage from the official salary scales.

As in most administrative datasets, the data contain relatively few individual characteristics. The teacher's gender and birth year are known. Note that we do not know the birth date. In addition information is present on whether the individual is a teacher, school principal or has a so-called support function. The data are richer on the characteristics of the school the teacher works in. First it is known whether the school is a primary or secondary institution, but the denomination of the school is also known; which can be either public, protestant, catholic or a rest category. The degree of urban development of the area the school is located in is recorded and finally there is information on the student population through the fraction of the pupils that come from an ethnic minority background.

Table 1 provides descriptive statistics for the dataset covering 1999 to 2002. The average teacher is 42 years old and 66% of the teachers in the Netherlands is female. 22% have a part time contract. The average gross monthly wage is about 2600 Euro and average monthly income of a teacher during this period was 1859 Euro. More than 60% of Dutch school teachers work in primary education. One third of the teachers are employed by a public school. One quarter of the teachers work in a school which has only native Dutch pupils whereas 9% works in schools where only pupils from a disadvantaged ethnic minority (of a predominantly Turkish and Moroccan origin) attend. Finally, about one fifth work in a strongly urbanized area (one of the major cities in the west of the country; Amsterdam, Rotterdam or the Hague), and 30% work in more rural areas.

Absenteeism is recorded in the administrative data as daily spells with a start and an end date. A spell starts when a teacher is reported as being absent, a spell ends when the teacher reports back to work. For every spell a reason for the absenteeism is entered. Categories include training, pregnancy leave and sickness. All spells with are marked as sickness spells are used to construct the sickness absenteeism variable.

The measure for sickness absenteeism used in this paper is the total number of

[2] The data do not record the actual days teachers work and it is therefore not possible to distinguish between a teacher who works 2.5 days a week or a teacher who works half days every day.

days a teacher reports being sick. Since teachers are not necessarily employed for the whole year by the institution, absence is normalized by dividing the number of sickness days by the total number of days that the teacher had a contract with the school. Note that this latter number is independent of the number of days the teacher actually worked. Note also that the sickness refers to a single school. If a teacher has been employed by more than one school then there is more than one observation in the final dataset. In the empirical analysis the reported standard errors will take this into account.

4 Empirical implementation

This section sets out the estimation method that will be used to estimate the effect of working time on absenteeism. The basic idea is to exploit the fact that teachers are eligible for subsidized work time reduction when they are 52 but not before. This implies that under certain conditions the effect of the policy on labor supply can be locally identified. Unfortunately the data contain only the birth year of the teacher and not the birth date. As a consequence it is not possible to know when exactly the teacher turns 52. When the teacher is 53 however, he qualifies for the policy while he does not when at age 51. Any observed change in working time between age 53 and 51 therefore includes a behavioral response to the change in the budget constraint that arises under the policy as outlined in section 2. There might however be other, time related, factors that can be confounded with a response to the policy. For this reason the estimation procedure implements a difference-in-differences procedure, where the change in working time of a slightly younger cohort is used to difference out these time effects (see Blundell and MaCurdy (1999) for an insightful discussion of difference-in-differences estimators in a labor supply context).

Using this identification approach three interesting parameters are estimated. First the reduced form effect of i) the policy on labor supply, and ii) the policy on absenteeism. Finally the effect of labor supply on absenteeism is recovered. The following subsections outline the estimation procedure in detail, and spell out the underlying assumptions.

4.1 The effect of the policy on working time

Assume hours worked is defined as follows

$$h_{it} = \gamma \delta_{it}^{a} + \eta_i + m_t + \varepsilon_{it} \tag{2}$$

where η_i is a time invariant individual effect capturing taste for work, m_t is a time effect which may also depend on age, and δ_{it} is a zero-one indicator that equals one if a teacher is eligible for subsidized work time reduction:

$$\delta_{it}^{a} = 1\{age_i \geq a\}$$

where $a = 52, 56$.

As mentioned above, because the data contain only birth year it is not possible to determine when exactly during a calendar year a teacher becomes eligible for the policy. For this reason we do not use the information from the year in which an individual becomes eligible. Instead we compare the earliest year in which a teacher is unambiguously eligible and compare this to the latest year in which the individual was not eligible. The exposition is framed in terms of the first subsidized work time reduction at age 52, but can be reformulated in a straightforward manner to apply to the second subsidized work time reduction at age 56.

We proceed as follows. First, difference (2) with lag 2. This results in the following expression.

$$\Delta_{-2} h_{it} \equiv h_{it} - h_{i,t-2} = \gamma \Delta_{-2} \delta_{it} + \Delta_{-2}(m_t + \varepsilon_{it})$$

Because 53-year-olds are eligible whereas they were not at age 51 it now follows that

$$E[\Delta_{-2} h_{it} | age = 53, t] = \gamma + E[\Delta_{-2}(m_t + \varepsilon_{it}) | age = 53, t] \tag{3}$$

and similarly for 51-year-olds the following expression results.

$$E[\Delta_{-2} h_{it} | age = 51, t] = E[\Delta_{-2}(m_t + \varepsilon_{it}) | age = 51, t] \tag{4}$$

The average effect of the policy on working time is found by taking the difference between (3) and (4):

$$\gamma = E[\Delta_{-2} h_{it} | age = 53, t] - E[\Delta_{-2} h_{it} | age = 51, t] \tag{5}$$

if the following condition holds

$$E[\Delta_{-2}(m_t + \varepsilon_{it})|age = 53, t] = E[\Delta_{-2}(m_t + \varepsilon_{it})|age = 51, t] \tag{6}$$

This is the standard "common trend" assumption made in difference-in-differences estimation.

Since all the relevant components are observed, we can replace the right hand side of (5) with the sample analogue, which gives the following difference-in-differences estimator of γ, the effect of policy on h:

$$\hat{\gamma}_{53,51} = \overline{\Delta_{-2}h_{it}}^{53} - \overline{\Delta_{-2}h_{it}}^{51} \tag{7}$$

The validity of (7) hinges on the common trend assumption (6).

4.2 The effect of the policy on absenteeism

The aim of the policy is to reduce teachers' labor supply in the intensive (hours worked) margin with the intention to reduce their sickness absenteeism. In this light consider the following structural sickness absence equation.

$$s_{it} = \phi h_{it} + \varphi_i + n_t + \varepsilon_{it} \tag{8}$$

In this equation s_{it} is a measure of teacher's i sickness absenteeism in year t. In addition there is an individual fixed effect φ_i and a time effect n_t. By substituting (2) into (8) we obtain the following reduced form population model of sickness absenteeism

$$s_{it} = \pi\delta^a_{it} + \tilde{\varphi}_i + \tilde{n}_t + \tilde{\varepsilon}_{it} \tag{9}$$

where $\pi \equiv \phi\gamma$, $\tilde{\varphi}_i \equiv \varphi_i + \phi\eta_i$, $\tilde{n}_t \equiv n_t + \phi m_t$,and $\tilde{\varepsilon}_{it} \equiv \varepsilon_{it} + \phi\varepsilon_{it}$. After differencing (9) we obtain the following equation

$$\Delta_{-2}s_{it} = \pi\Delta_{-2}\delta^a_{it} + \Delta_{-2}\tilde{n}_t + \Delta_{-2}\tilde{\varepsilon}_{it} \tag{10}$$

Proceeding in the same fashion as before, by comparing teachers at the earliest moment when they were eligible to the latest moment when they were not, we obtain the following expression

$$\pi = E[\Delta_{-2}s_{it}|age = 53, t] - E[\Delta_{-2}s_{it}|age = 51, t] \tag{11}$$

under the following condition

$$E[\Delta_{-2}\tilde{n}_t + \Delta_{-2}\tilde{\varepsilon}_{it}|age = 53, t] = E[\Delta_{-2}\tilde{n}_t + \Delta_{-2}\tilde{\varepsilon}_{it}|age = 51, t] \tag{12}$$

which, given assumption (6), reduces to

$$E[\Delta_{-2}n_t + \Delta_{-2}\varepsilon_{it}|age = 53, t] = E[\Delta_{-2}n_t + \Delta_{-2}\varepsilon_{it}|age = 51, t] \tag{13}$$

which is a common trend assumption in the structural equation (8). It requires that, in the absence of the policy, 53 and 51-year-olds would have had similar trends in sickness absenteeism.

Again we can replace the right hand side of (11) with sample analogues to obtain an estimator of the reduced form policy effect:

$$\hat{\pi}_{53,51} = \overline{\Delta_{-2}s_{it}}^{53} - \overline{\Delta_{-2}s_{it}}^{51} \tag{14}$$

4.3 The effect of work time reduction on absenteeism

Given estimates of the first stage effect of the policy on hours worked (7), and the reduced form effect of the policy on absenteeism (14), the effect of work time reduction on sickness absenteeism immediately follows given that $\pi = \phi\gamma$:

$$\hat{\phi}_{53,51} = \frac{\hat{\pi}_{53,51}}{\hat{\gamma}_{53,51}} = \frac{\overline{\Delta_{-2}s_{it}}^{53} - \overline{\Delta_{-2}s_{it}}^{51}}{\overline{\Delta_{-2}h_{it}}^{53} - \overline{\Delta_{-2}h_{it}}^{51}} \tag{15}$$

This is a 2SLS estimator of ϕ using $\delta_{it}^{a} = 1\{age_i \geq a\}$ as an instrument for $\Delta_{-2}h_{it}$ in the equation that results from differencing equation (8) with lag 2.

For the second subsidized work time reduction at age 56, assumptions (6) and (13) can be reformulated by replacing 53 by 57-year-olds and 51 by 55-year-olds.[3]

5 Results

Before presenting the results of the analysis set out in the previous section, this section will first provide more details on teachers' labor supply and then describe the incidence of absenteeism.

[3]Note that strictly speaking the effect that is identified at age 56 is conditional on the presence of the subsidized work time reduction policy from age 52 onwards.

Table 2: Fraction of working days lost due to absenteeism (full-time equivalents)

	1999	2000	2001	2002
Primary education	0.082	0.085	0.081	0.074
Secondary education	0.071	0.076	0.075	0.067
Wage sum (million Euro's)	344.5	381.5	391.5	393.9

5.1 Teachers' labor supply

Figure 2 plots the average hours worked relative to full-time for all cohorts of male and female teachers in primary and secondary education. By restricting the data to teachers that are observed throughout the sample period we minimize the influence of composition effects, while tracing out hours worked over the lifecycle. Since the data used in this paper cover 4 years, we are able to see whether there are cohort effects within this timespan.

First women work more part time than men. Moreover, as seen in the figure, there seem to be distinct life cycle patterns for men and women. For men, hours worked are relatively constant with age, only slightly decreasing slightly in their thirties especially for those working in primary education. Female teachers on the other hand increasingly start working part time from their mid twenties onwards. This is especially marked in primary education and is, in all likelihood, related to childbearing and subsequent care. From age 40 onwards, women start increasing their working time. Figure 2 also shows that first at age 52 and then at age 56 teachers markedly reduced their working time.

5.2 Patterns of absenteeism

Table 2 shows the fraction of working days in full-time equivalents that is lost because of sickness absenteeism among teachers in the Netherlands. Absenteeism is on average 0.8 percent point higher in primary education than in secondary education. Where it should be noted that the characteristics of teachers are different in primary and secondary education. Primary school teachers are older and more often female. Absenteeism peaks in 2000 and decreases after that (explanation). (Compare to other sectors)

The final row of table 2 shows the size of absenteeism as measured by teachers

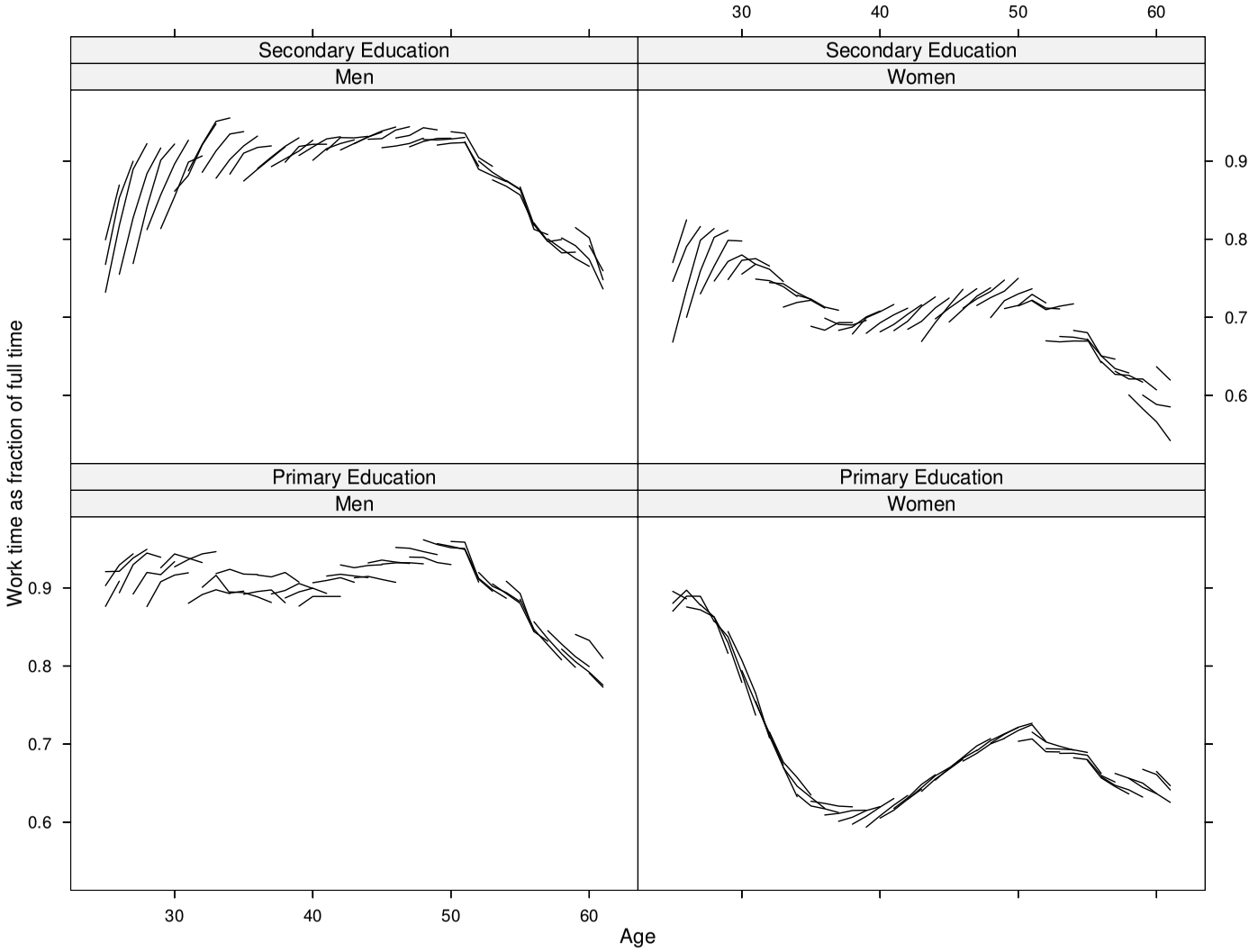


Figure 2: Average working time relative to full-time, by age and gender (1999-2002)

wages. More specifically, wage cost is calculated by first calculating per teacher the number of absent days in full-time equivalents. To calculate the wage cost per teacher this number is then divided by 31 to scale to months and finally multiplied by the monthly wage. The numbers in the table are the population sums per year. It can be seen that the amount of absenteeism as measured by wages is substantial, ranging from nearly 345 million Euro's in 1999 to 394 million in 2002. It is difficult to interpret these numbers are real costs. Teacher salaries may already take average absenteeism into account through an implicit insurance premium and be correspondingly lower. These numbers do clearly illustrate that teacher absenteeism is substantial.

Table 3 presents result from a regression of the fraction of days lost on various individual and school characteristics. Table 3 confirms that absenteeism increases steeply with age keeping constant school characteristics. Women are on average 1.5 percent point more absent than men. Where table 2 showed that absenteeism is higher in primary than in secondary education we see that this difference disappears once we control for teacher demographics and school characteristics.

Interestingly, teachers on a temporary contract are less absent than their colleagues with a permanent contract. This suggests that the fact that their employment is less certain has a disciplinary effect, and that at least part of the absenteeism, although teacher report sick, in fact has a shirking nature. Absenteeism is higher in public schools, even keeping constant pupil composition and the degree of urbanization of the area where the school is located. Absenteeism is somewhat lower in rural area's, and in schools where the student population is more heterogeneous. This latter finding could be explained by the facts that due to the compensatory school finance system class size is much lower in schools with many disadvantaged students. Finally, there is no clear time trend.

We have seen that absenteeism is not only considerable, but increases substantially with age. This also apparent from figure 3. The absence rate increases from 7 to 17 percent between age 40 and 60. The figure also shows that the average number of sickness spells increase after age 45. For both measures of sickness absence a drop can be observed at age 52 when teachers reduce their working time. At age 56, the second point of eligibility, again a clear drop in the average number of spells is observed, whereas the fraction of time sick does not show a marked drop. Figure 3 clearly suggests that the work time reduction policy does have an effect on sickness absenteeism.

Table 3: Fraction of days lost due to sickness absence of teachers, OLS

Variable	Coefficient	Std.error
Age (ref=21-25)		
- 26-35	0.0219	(0.0012)
- 36-45	0.0305	(0.0011)
- 46-55	0.0633	(0.0011)
- 56-65	0.1073	(0.0014)
Female	0.0146	(0.0006)
Temporary contract	-0.0386	(0.0007)
Primary	-0.0003	(0.0007)
Denomination (ref=public)		
- Catholic	-0.0165	(0.0007)
- Protestant	-0.0115	(0.0007)
- Other private	-0.0014	(0.0009)
% Migrant pupils (ref=100)		
- 0	0.0198	(0.0012)
- 0-50	0.0121	(0.0012)
- 50-70	0.0091	(0.0012)
- 70-100	0.0044	(0.0012)
- Unknown	0.0173	(0.0018)
Urban Area Index (ref=1, big city)		
- 2	0.0010	(0.0007)
- 3	0.0022	(0.0008)
- 4	0.0050	(0.0010)
- 5	-0.0079	(0.0016)
Year (ref=1999)		
2000	-0.0040	(0.0010)
2001	-0.0003	(0.0008)
2002	-0.0056	(0.0008)
Intercept	0.0379	(0.0017)
R-squared		0.0256
N		708807

Note: Standard errors are heteroscedasticity robust, and corrected for clustering at the school level.

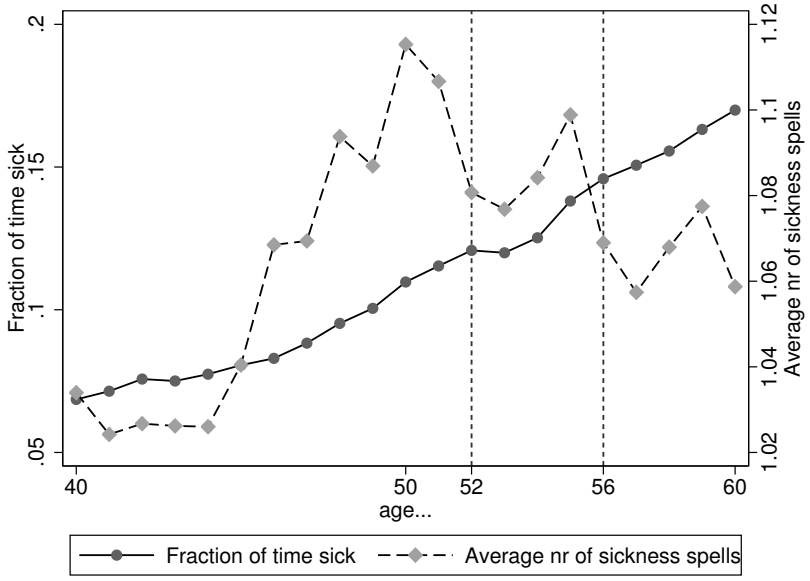


Figure 3: Fraction of days reported sick and sickness spells by age (1999-2002)

5.3 The effect of the policy on hours worked

Table 4 presents the effects of the two components of the policy on hours worked, for the whole population and for men and women separately. The first set of results show the effect of being eligible to a 10% work time reduction at age 52 for 53-year-olds. The depend variable is hours worked relative to full-time. The first column shows that, on average, 53-year-old teachers reduce their hours worked by 3.9 percent points. Columns (2) and (3) show that men reduce their labor supply by more than women.

The second set of estimates in table 4 show the effect of being eligible to a additional 10% work time reduction at age 56 for 57-year-olds. The average additional work time reduction is 3.6 percent, reduction being higher for men than for women. At these estimates are statistically significant at conventional levels, and the policy thus has an important effect on hours worked, reducing hours worked on average by about 4%.

To gain more insight about the incidence and use of the subsidized work time reduction scheme, table 5 shows the distribution of work time reduction for teachers aged 53 and 57. At age 53, when teachers are eligible for the first tranche of subsidized work time reduction, nearly 40 per cent of the teachers makes use of

Table 4: The effect of the policy on hours worked

	$\hat{\gamma}_{age,age'} = \overline{\Delta_2 h_{it}}^{age} - \overline{\Delta_2 h_{it}}^{age'}$		
	All	Male	Female
	(1)	(2)	(3)
$age = 53, age' = 51$	-0.039	-0.047	-0.032
	$(0.002)**$	$(0.002)**$	$(0.002)**$
F	633.4	524.9	199.0
$age = 57, age' = 55$	-0.036	-0.041	-0.029
	$(0.002)**$	$(0.002)**$	$(0.003)**$
F	405.5	272.9	124.9

Table 5: Work time reduction as a fraction of contracted work time (1999-2002)

	Age=53	Age=57
None	60.7	43.1
1 - 9%	6.6	4.8
10%	30.5	10.8
11% - 19%	2.0	8.1
20%	0.1	30.5
21% - 50%	0.1	2.7

this provision. There is substantial bunching at the corner (0.1), but 7 per cent of the eligible teachers reduces working time by less than the maximum amount. About 2 per cent reduce working time by more than 10 per cent, which may arise if they make use of the possibility to advance the leave they would be eligible to from age 56 onwards if they commit to retire at age 61 (as explained in section 2). By age 57, when teachers are eligible to a maximum of 20 per cent reduction in work time, use of the leave increases to 57 per cent. Again there is bunching at the corner (30.5 per cent) with a substantial fraction of the teachers having a reduced workload that lies between zero and 20 per cent. The bunching is consistent with the static neo-classical labor supply model (e.g. Saez, 2002).

Table 6: The reduced form effect of the policy on absenteeism

	$\hat{\pi}_{age,age'} = \overline{\Delta_2 s_{it}}^{age} - \overline{\Delta_2 s_{it}}^{age'}$		
	All	Male	Female
	(1)	(2)	(3)
$age = 53, age' = 51$	-0.011	-0.013	-0.009
	$(0.004)**$	$(0.006)*$	(0.006)
$age = 57, age' = 55$	-0.001	0.005	-0.008
	(0.005)	(0.007)	(0.007)

Table 7: The effect of hours worked on absenteeism

	$\hat{\phi}_{age,age'} = \frac{\overline{\Delta_2 s_{it}}^{age} - \overline{\Delta_2 s_{it}}^{age'}}{\overline{\Delta_2 h_{it}}^{age} - \overline{\Delta_2 h_{it}}^{age'}}$		
	All	Male	Female
	(1)	(2)	(3)
$age = 53, age' = 51$	0.275	0.271	0.277
	$(0.102)**$	$(0.122)*$	(0.173)
$age = 57, age' = 55$	0.032	-0.122	0.270
	(0.137)	(0.175)	(0.240)

5.4 The effect of the policy on absenteeism

Table 6 present the reduced for estimates of the policy on absenteeism for 53 and 57-year-olds. The first set of results shows the effect at age 53. The policy decreases absenteeism on average by 1.1 percent point. This is statistically significant. Columns (2) and (3) show that this effect is only statistically significant for men, although for women the point estimate is close to that of men with the same standard error. For the second reduction at age 56 there is no effect on absenteeism, neither for men nor for women. Although for women the point estimate is comparable to the one found at age 53.

5.5 The effect of work time reduction on absenteeism

Given the reduced form estimate of the policy on absenteeism and the first stage estimate on hours worked, we can calculate the 2SLS estimate of hours worked on absenteeism. This is interesting to the extent that one would like to expand the amount of leave teachers are eligible in the context of the work time reduction policy. Table 7 presents the results.

The estimates for 53-year-olds show that absenteeism decreases by on average 27.5% of a given work time reduction. This effect is statistically significant and of the same magnitude for both men and women. For 57-year-old men additional work time reduction does not seem to reduce absenteeism. For women the point estimate of the effect at age 57 is identical but not statistically significant.

6 Conclusions

This paper investigates how a policy that is aimed to increase the labor force attachment of older teachers affects their labor supply and absenteeism. This policy allows teachers older than 52 to reduce their working hours by 10% at the cost of a 3.5% salary reduction. When teachers turn 56 they can reduce their work load by another 10% at the same cost. This measure therefore introduces a change in teachers budget constraints the moment they turn 52 respectively 56. This paper uses cross-sectional and longitudinal variation to assess the effect of this policy on teachers labor supply and the subsequent effect on absenteeism.

It is found that the policy reduces the working time of teachers. It is also found that the first component of the policy decreases absenteeism among teachers by, on average, 1.1 percent point. Although this effect is only statistically significant for men. The additional leave available to teachers at age 56 does not seem to lower absenteeism. The variation generated by the policy is also exploited to estimate the effect of working time on absenteeism. The estimates for 53-year-olds show that absenteeism decreases by on average 27.5% of a given work time reduction. Although this effect is only statistically significant for men, the point estimate for women is the same.

In the Netherlands teachers are civil servants. Other employees in the public sector face identical sickness insurance arrangements. In many other respects teachers are similar to other civil servants, and it is not unlikely that parts of the analysis generalize to this broader population.

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