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## ROA Research Memorandum

ROA-RM-2024/4E

**Researchcentrum voor Onderwijs en Arbeidsmarkt | ROA**
*Research Centre for Education and the Labour Market | ROA*

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October 2024

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ISSN: 2666-8823

## Abstract

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Like in many other high-income countries, the Netherlands experiences significant staff shortages in both healthcare and education. The key shortage occupations in these sectors are nurses and teachers. Both occupations suffer from high retirements rates and encounter difficulties in attracting and retaining (early career) workers. Due to early attrition, both sectors accumulate considerable hidden reserves. In this study, we estimate the magnitude of these hidden reserves and explore directions for unlocking this untapped potential. We define the hidden reserve as individuals who obtained a nursing or teaching diploma, but are not employed in the healthcare or education sector. Our definition of the hidden reserve also encompasses the number of additional hours that part-time workers could supply to reach a full-time working week. Using registry data, we show that the hidden reserves among (former) nurses and teachers by far exceeds the current staff shortages. Our analysis of survey data reveals that inactive nurses and teachers perceive several working conditions more favorably than their active counterparts. Activating this hidden reserve could involve strategies such as reducing work pressure and providing greater control over working hours, salary, and autonomy.

JEL classification: J2, J3, J45, J81, I1, I2
Keywords: Labour shortage; teachers; nurses; employee turnover; hours of work

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* The authors acknowledge financial support from Instituut Gak under project 'Scenario's voor matchen van vraag en aanbod in de zorg en het onderwijs'. The authors would also like to thank David Jongen, Catharina van Oostveen and Freddy Weima (members of supervisory committee), and Jerien den Blanken (Dutch Ministry of Education, Culture and Science) for their helpful feedback and insightful discussions.

## 1. Introduction

Workforce shortages in healthcare and education pose a challenge to access and quality of healthcare and education, and contribute to global inequities. These concerns have been increasingly pertinent to high-income countries, such as the Netherlands. Key shortage occupations within these two sectors are nurses and teachers (OECD/European Union 2022; OECD, 2021). Both nurses and teachers are considered essential occupations and shortages in these occupations have immediate effects on access to these vital public services. As good quality healthcare and education are essential for well-being in society and for economic development, the problems of staff shortages are a major concern.

There is considerable evidence on the causes of these shortages, specifically on the (regional) dynamics of demand and supply (see e.g. Hanushek et al., 2004; Ingersoll, 2004; Van Merode et al., 2024). For example, both workforces are considerably affected by demographic trends such as a decline in birth rates, the subsequent aging of society and increasing retirement rates. In the healthcare sector, the decrease in the supply of health workers due to retirement is accompanied by an increase in demand for healthcare services. This heightened demand is driven by the large birth cohorts born after the Second World War, who are now reaching an age where they increasingly require healthcare, exacerbated by the overall increase in life expectancy (OECD/European Union, 2022). Many nurses also leave the profession before they reach the retirement age due to high levels of workload, stress and fatigue (WHO, 2022). In the education sector, high teacher retirement, a reduction in the enrollment in teacher training programs and the increase in educational attainment of students create a mismatch between supply and demand for teachers (Ingersoll & Perda, 2010). Retirement is considered a form of attrition and a structural problem inherent to the education sector, which typically also includes inexperienced teachers leaving their profession early on in their careers (OECD, 2021; Statistics Netherlands, 2020b).

The specific reasons for inflow and outflow of staff are complex and intertwined, as the determinants of labor supply are based on individuals' decisions made in response to different information and in different points in time (Hanushek et al., 2004). A common indicator for the inflow of staff is the graduation rate of students in the respective field. In the Netherlands, only little more than half of the students who enter a nursing program complete their studies and obtain a nursing diploma (between 55% and 62% of the cohort starting in the years 2017-2019). Between 2016 and 2019, one out of ten graduate nurses left the nursing profession within the first year after graduation (Kox et al., 2020; Statistics Netherlands, 2020a). A qualitative study among Dutch novice nurses who have chosen to leave their profession identified several important reasons for their early exit: a lack of

challenge, passion, and perceived competence; low job satisfaction due to a heavy workload; reduced work capacity due to non-work-related health conditions; and a lack of belonging and support from colleagues and supervisors (Kox et al., 2020).

Similarly, the Dutch education sector faces increasing teacher shortages at almost all levels of education, including primary and secondary education. Even though the enrollment rates for teacher training programs have increased slightly since 2021 in the Netherlands, the number of enrolled first-year students in 2018 was still half of those 15 years before (Statistics Netherlands, 2018). Furthermore, the problem of teacher attrition also applies to the Netherlands, with a relatively large share of teachers leaving their profession within five years after graduation (Statistics Netherlands, 2020b). The main reasons of this early attrition among Dutch beginning secondary teachers include stress due to high psychological task demands such as long teaching hours and negative student aspects (e.g., student misbehavior and poor relationships to students) (Harmsen et al., 2018).

Overall, these statistics show that the inflow of new staff might not be the primary bottleneck for the prevailing shortages and cannot be separated from early professionals' career mobility. Recently, enrollment in nursing and teaching programs has been slightly increasing again (OECD/European Union, 2022; Statistics Netherlands, 2018). If the number of students formally qualified to work in the professions is sufficiently high, but shortages persist, this indicates a problem in retaining nurses and teachers or fragile study-to-work transitions. Hence, it might be worthwhile to examine the number of workers who have obtained the necessary formal qualifications to work as a nurse or teacher but who are not currently active in these professions. Therefore, this paper aims to quantify the so-called "hidden reserves", or "reserve pools" of nurses and teachers in the Netherlands.

Only a few studies have attempted to estimate the size of nurse and teacher reserve pools, or have referred to reserve pools as untapped potential that could be mobilized to support the gaps in labor supply. In this limited literature, we observe differences in the definition of these hidden reserves: According to Cagampang et al. (1985), teacher reserve pools consist of persons with valid credentials that are currently not teaching. Specifically in the education context, they define it as the remainder of non-teaching teachers after subtracting those groups who are not available to re-enter teaching, such as retired, deceased or disabled and emigrated teachers.

Ingersoll and Perda (2010) scrutinize multiple sources of new teachers for the profession, and among others, define the reserve pool as one of them. The reserve pool contains delayed teaching entrants, and re-entrants. Within the reserve pool, they distinguish between teachers who are qualified to teach and those who are *qualified and willing* to teach. This sheds light on whether staffing

bottlenecks arise from an insufficient quantity of qualified teachers initially produced, or an insufficient number of teachers actually willing to teach (Ingersoll & Perda, 2010). The latter would rather suggest an issue inherent to the occupation or its working conditions than an actual shortcoming in the mere production of qualified teachers. Relatedly, Klostermann et al. (2006) define the reserve pool as the group of teachers who would consider to work under the right conditions. Examining these conditions in early childhood centers in Illinois, US, the researchers find that higher salaries would trump all other conditions as an incentive for early-childhood teachers in the reserve pool to re-enter the teaching profession.

In the healthcare sector, the recent surge in the demand for healthcare services induced by the COVID-19 pandemic has created attention to at least temporarily mobilize reserve pools, e.g. by renewing retired physicians' medical licenses (Castner et al., 2021) or recalling healthcare workers who have withdrawn from their profession (Kahn et al., 2020) and to pull them back into the workforce.

In this study, we define the hidden reserve as individuals who have obtained a degree to work in the teacher or nurse profession, who are however not currently active in the healthcare or education sector. Ideally, we would observe whether individuals are employed in the teacher or nurse profession, but unfortunately, we only identify the sector of employment in the register data that we use for our analyses. Individuals in the hidden reserve can work in a different sector, can be (temporarily) unemployed, can be retired or can be registered as a student. We also include retired teachers and nurses in our definition of the hidden reserve as previous studies have shown that workers close to the retirement age can be incentivized to delay their retirement (Brown, 2013; Kim, 2023; Koedel & Xiang, 2017). Moreover, we estimate how large the hidden reserve is among part-time workers. We analyze the potential additional hours that part-time nurses and teachers could work, assuming a full-time contract entails 36 hours per week (which is the amount of hours for a full-time contract according to the collective wage agreement).

Our contribution to the literature is threefold. First, we quantify the size of two hidden reserve pools 1) for nurses and 2) for teachers in the Netherlands. Although we are particularly interested in nurses and teachers, we also quantify the hidden reserve for nurse assistants, healthcare assistants and teaching assistants as these workers can substitute nurses or teachers in the performance of a variety of tasks. Second, we also offer detailed information on the labor market status of individuals in the hidden reserve. Using rich register data from Statistics Netherlands, we present informed estimates about the labor force potential that is hidden in Dutch reserve pools. In our analyses, we also provide estimates of the hidden reserve in different labor market regions and for different occupational subgroups such as nurses and nurse assistants, as well as different types of teachers including STEM

and language teachers. Finally, our study also offers insights based on survey data into differences in the working conditions of workers employed in the healthcare or education sectors and those who belong to the hidden reserve. These descriptive analyses provide an additional understanding of the reasons for why workers leave the nursing and teaching profession. Hence, this study primarily focusses on supply-side factors of nurse and teacher shortages.

This paper is structured as follows. Section 2 explains how the Dutch education system is organized and how individuals can be trained to work in the healthcare or education sector. In Section 3, we describe the data we use for our analyses and in Section 4 we present the results. Finally, Section 5 discusses the results and concludes.

## 2. The Dutch Education System

The majority of the healthcare and education workforce in the Netherlands is trained through the Dutch education system. The Dutch education system is depicted in Figure 1 in Appendix A. Most nurses obtain their diploma either through an mbo level 4 or hbo bachelor nursing program. The mbo nursing program (in Dutch: mbo verpleegkunde) typically takes three to four years to be completed and results in a vocational nurse certificate (EQF level 4). The hbo bachelor nurse program (in Dutch: hbo verpleegkunde) takes four years and leads to a bachelor nurse certificate (EQF level 6). Many students also continue their education in an hbo bachelor nursing program once they have completed the mbo nursing program. To become a nurse assistant (in Dutch: mbo verzorgende), students typically complete mbo level 3 (EQF level 3) and the program typically takes two or three years. Healthcare assistants (in Dutch: mbo helpende) are usually trained through mbo level 2 (EQF level 2) which takes one to two years.

Most teachers are trained in higher education, either through a university of applied sciences or a research university. The majority of students complete an hbo bachelor program (EQF level 6) to become a primary or secondary school teacher. The teacher-training program for primary education prepares students to become a primary school teacher for children aged 4-12 years (in Dutch: pabo). Since 2008, research universities also offer academic teacher training programs for primary education. The academic programs for primary education always comprise of a partnership between a research university and one or more universities of applied sciences. These programs offer an integrated curriculum and upon completion of the program, students receive a university bachelor's degree in educational sciences or pedagogical sciences as well as a pabo degree. The universities of applied sciences also offer a range of bachelor programs preparing students to become a teacher in a specific subject in secondary education (e.g., Dutch, biology, physics, or history). These hbo programs allow

graduates to teach secondary school students in all vmbo grades as well as students in the first three grades of havo or vwo (also referred to as second-degree teachers). Hbo master programs have specific programs that prepare students to become a teacher allowing graduates to also teach students in the highest grades of havo and vwo. Students can also obtain a (research) university diploma that enables them to teach a secondary school subject, either through an educational minor during the bachelor's program or through a university master's program (EQF level 6). The master programs at research universities combine subject-specific content with courses on education science and didactics. Similar to the hbo teacher programs, the educational minor allows graduates to teach secondary school students in all vmbo grades and in the first three grades of havo or vwo (also referred to as first-degree teachers). In contrast, teachers with a master's degree (EQF level 7) are qualified to teach secondary school students in all grades and levels. Through mbo level 4, students can pursue their diploma to work as a teaching assistant (EQF level 4).

## 3. Data

### 3.1 Diplomas

*Register data Statistics Netherlands*

To quantify the size of the hidden reserves of nurses, nurse assistants, healthcare assistants, teachers, and teaching assistants, we use register data from Statistics Netherlands. To identify mbo graduates, we use the *Diplomambotab* file from Statistics Netherlands. The *Diplomambotab* contains all individuals who obtained their mbo diploma between 2004 and 2022. We use the *Diplomahatob* file from Statistics Netherlands to identify all individuals who obtained their hbo or wo diploma between 2000 and 2022. Before these periods, education diplomas were not registered.

From the register data, we identified all mbo, hbo and wo programmes that prepare students for one of the five occupations of interest. For teachers, we restricted the sample to teachers who have been trained to teach in primary education, secondary education, and special education. We excluded teachers who have been trained to teach a vocational subject such as music or painting.[1,2] In the case that individuals acquired more than one diploma, we identified the highest obtained diploma.[3] For example, if individuals obtained an mbo (EQF level 4) as well as hbo nursing diploma (EQF level 6),

[1] An overview of all the mbo programs (crebocodes) and hbo and wo programs (crohocodes) is available upon request.

[2] The Stata syntax that we constructed to identify the relevant diplomas is available upon request.

[3] In the case that individuals had more than one higher education diploma at the level, we selected the diploma that was indicated to be the main diploma (in Dutch: hoofddiploma).

we only considered the hbo nursing diploma. In the case that individuals have more than one diploma at the same level of education, we only considered the latest obtained diploma. We neglect the fact that individuals might have been trained both as a nurse and teacher. However, the percentage of individuals who have both diplomas is very small, namely, 1.21%.

In some of our analyses, we also distinguished between different types of secondary school teachers, namely STEM-subject teachers, language teachers, other language teachers, and other subject teachers. The STEM-subjects include math, physics and chemistry. The language teachers teach one of the languages that students are required to learn and that schools are required to offer, namely Dutch, English, French and German. Other language teachers teach a language other than the four languages listed above such as Spanish or Italian. Other subject teachers teach subjects including history, geography and biology. We further distinguish between first-degree and second-degree teachers.

*Labor Force Survey*

Given that the register data starts in 2000 for hbo and wo graduates and in 2004 for mbo graduates, we also make use of survey data from the Dutch Labour Force Survey (LFS).[4] The Dutch LFS data enables us to provide an estimate of the hidden reserve among individuals who obtained their diplomas before Statistics Netherlands started registering diplomas. The Dutch LFS is a large rotating household panel survey with five waves and provides information on the labor market status of individuals aged 15 and older in the Netherlands. We used the survey data of 2022 to obtain an estimate of the number of individuals who obtained their nurse or teacher diploma before the period that Statistics Netherlands started registering diplomas. Since the LFS surveys individuals for five quarters in a row, we restricted the data to the last quarter in which individuals were surveyed. For each individual, we identified the field of study of the highest obtained educational diploma. In the LFS data, we can distinguish between two types of teacher training programs: 1) primary- and special education teachers, and 2) secondary education and vocational subject teachers. Furthermore, we can identify whether individuals have been trained as a nurse or midwife, but we cannot distinguish between the two fields. The data do not allow us to distinguish between more fine-grained fields of study. For those with a nurse or midwife diploma, we made a distinction between those who have been trained in vocational education and those who have a bachelor degree. We restricted the sample to individuals who obtained their diploma from vocational education before 2004 and to individuals who obtained their higher education diploma

[4] For more information about the Dutch Labour Force Survey, see: https://www.cbs.nl/en-gb/our-services/methods/surveys/brief-survey-description/labour-force-survey--lfs--

before 2000. To obtain an estimate of the number of graduates who have been trained as a healthcare- or education worker, we multiplied each observation with the sample weights and added them up.[5]

### 3.2 Labor market status

*Register data Statistics Netherlands*

To determine the labor market status of individuals who have been trained to become a teacher or nurse we used the *SPOLISBUS* file of Statistics Netherlands for the year 2022. The *SPOLISBUS* file contains monthly information on jobs and wages of employees who receive an income from a Dutch employer. We restricted the dataset to jobs that existed on 31 December 2022. Hence, jobs that for example ended on 15 December 2022 were removed from the dataset. It is important to note that individuals can hold multiple jobs at the same time, also with the same employer.

For every individual who held a job on 31 December 2022, we identified whether they were employed in a job in the healthcare or education sector. We used the Standard Industrial Classifications (Dutch SBI 2008) that distinguished 37 sectors in which individuals hold a job. According to our definition, individuals work in the healthcare sector if their sector of employment has the SBI-code "Healthcare and welfare" (in Dutch: Gezondheids- en welzijnszorg) and in the education sector if their sector of employment has the SBI-code "Education" (in Dutch: Onderwijs)[6]. We considered workers to be in salaried employment in the healthcare or education sector if they held at least one job in one of these two sectors. Unfortunately, we do not observe the occupation of individuals in the register data. Hence, an individual with a teaching diploma might work as a manager or policymaker in the education sector but not as a teacher. We therefore underestimate the true size of the hidden reserve.

For individuals who were not in salaried employment, we identified their main socioeconomic status on 31 December 2022 using the *SECMBUS* file for the year 2022. The *SECMBUS* files contain monthly information on the socioeconomic status of individuals, which is determined by their main source of income in a specific month. The data distinguishes between the following socioeconomic categories: 1) employee, 2) self-employed, 3) director/major shareholder, 4) family worker, 5) unemployment benefit, 6) social assistance benefit, 7) sickness benefit, 8) pension benefit, 9) other social benefits, 10) no income, 11) registered as student, and 12) socioeconomic status unknown. For

[5] The sample weight variable is called *EbbGewJaarGewichtA.*

[6] Note that these sector definitions are quite broad. The Healthcare and welfare sector, for example, also encompasses dental practices and physiotherapy practices. The Education sector also includes subsectors including higher education and educational services. Because these subsectors typically do not employ workers in the occupations of interest, our study offers an underestimate of the hidden reserve.

individuals who were self-employed we identified whether they worked in the healthcare or education sector. Individuals who were in salaried employment or self-employed in the healthcare or education sector are not part of the hidden reserve. We considered all remaining individuals to be part of the hidden reserve. We assigned individuals who are part of the hidden reserve to three different categories: 1) employed in another sector (as employee, self-employed, director/major shareholder, or family worker), 2) not employed (receives unemployment-, social assistance-, sickness-, pension-, or other social benefit, no income, or socioeconomic status unknown), and 3) registered as a student.

To estimate the hidden reserve among part-time workers, we calculated the number of working hours per week of individuals who were employed in the healthcare or education sector using the *SPOLISBUS*. In the case that individuals held more than one job in these sectors, we calculated the total number of working hours across jobs.

Finally, we matched the individuals – with a healthcare or education diploma – who we identified in the LFS data to the register data and applied the same procedure as to the individuals in the register data.

### 3.3 Working conditions

*Netherlands Working Conditions Survey*

To examine whether the working conditions differ for workers in the healthcare or education sector on the one hand, and for workers in the hidden reserve on the other hand, we used data from the Netherlands Working Conditions Survey (in Dutch: NEA) covering the years 2014-2021. We examined a range of job characteristics, including the perceived autonomy, emotional and physical demands, working overtime, (control over) working hours, work pressure, work-life balance, burnout symptoms, absenteeism, satisfaction with salary and working conditions, job interest, learning opportunities, social support from colleagues and managers, and overall job satisfaction.

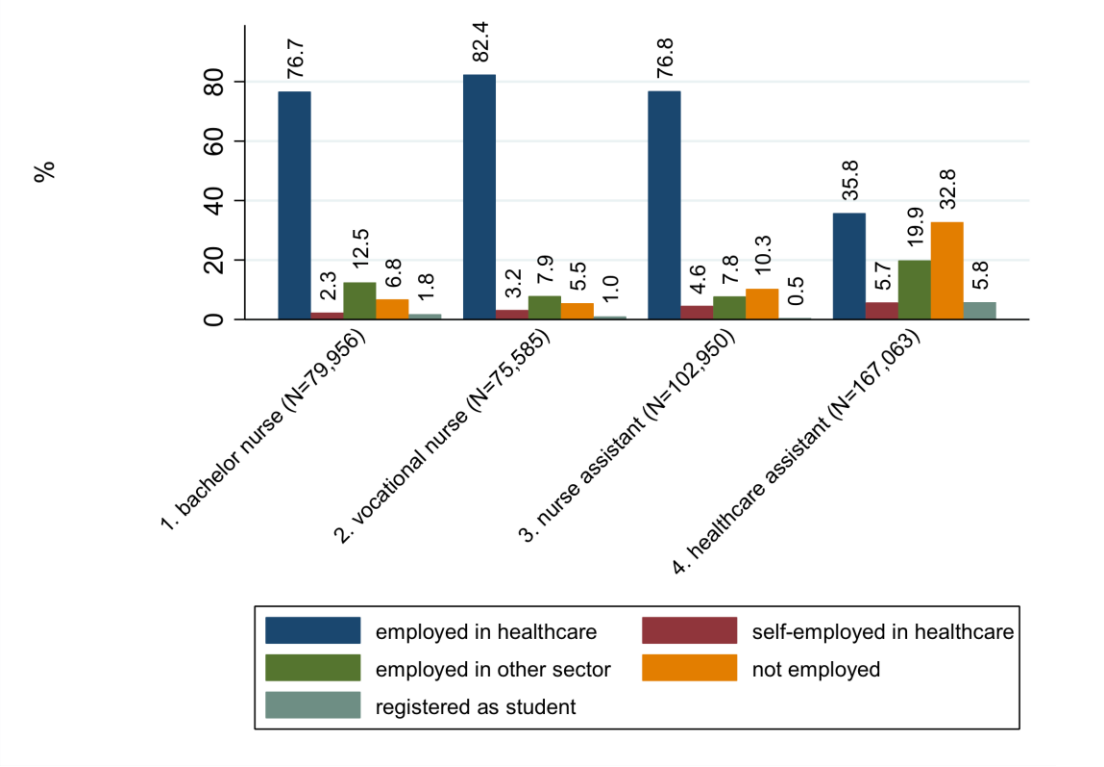
We matched the individuals with a healthcare- or education diploma who we identified in the register data to the NEA data. Next, we used the occupation variable (the Dutch BRC 2014 classification) in the NEA dataset to determine whether individuals were employed in the occupation for which they were trained or were part of the hidden reserve. We considered individuals to be working as a teacher if their occupation was a primary school teacher, a secondary school teacher or as a vocational subject teacher. For healthcare workers, we distinguished between nurse specialists, nurses, and nurse assistants. We considered all other workers who were not employed in these occupations as part of the hidden reserve.

## 4. Results

### 4.1 Size hidden reserve

Figure 1 shows the results obtained from our analyses of the register data. According to the register data, 79,956 individuals graduated as a bachelor-trained nurse between 2000 and 2022. Between 2004 and 2022, 75,585 individuals graduated as a vocational-trained nurse, 102,950 individuals graduated as a nurse assistant, and 167,063 individuals acquired a healthcare assistant diploma. As can be observed from Figure 1, the largest hidden reserve is among individuals who have been trained as a healthcare assistant, namely 58.8%. The smallest relative hidden reserve is among vocational-trained nurses. Out of all graduates, 82.4% worked in salaried employment in the healthcare sector on 31 December 2022 and 3.2% is self-employed in the healthcare sector. In total, 14.4% of the graduated vocational-trained nurses belong to our definition of the hidden reserve. Individuals in the hidden reserve either worked in a different sector (7.9%), are not employed (5.5%) or follow education (1.0%).

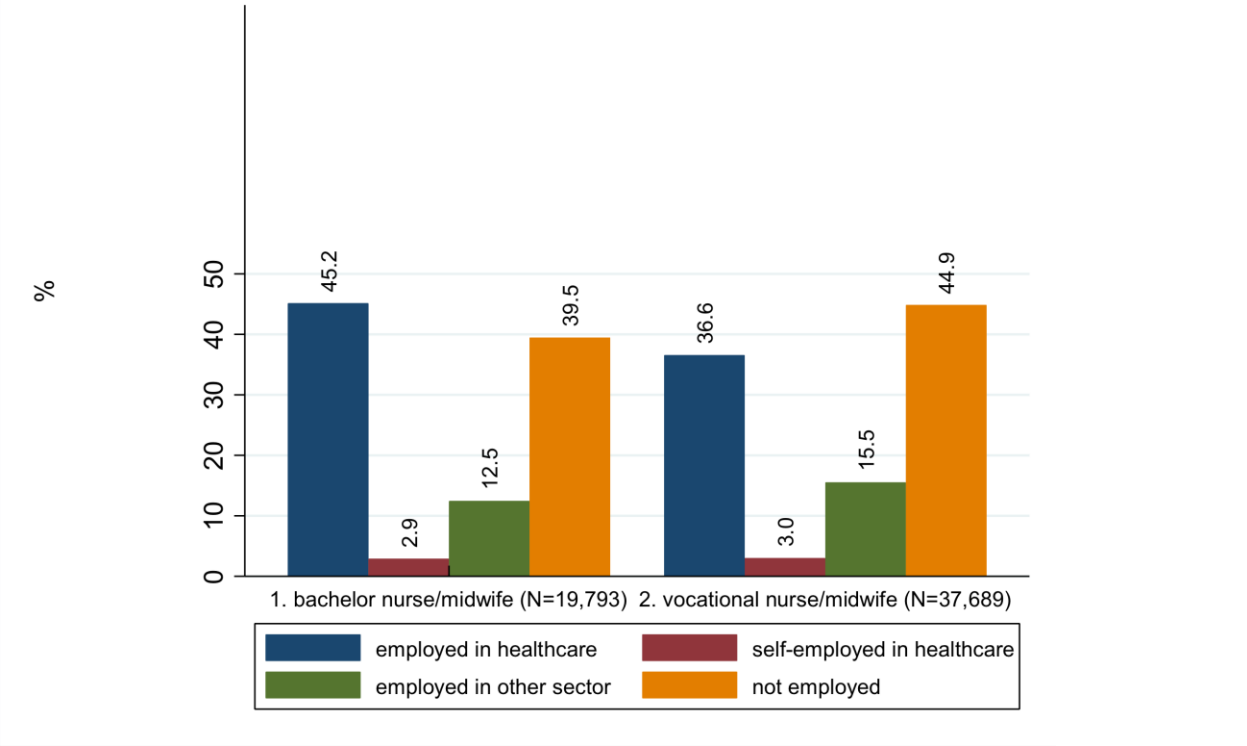
**Figure 1. Labor market status healthcare workers end of 2022 according to register data**




***Notes:*** *Bachelor nurse refers to individuals who obtained a bachelor degree in nursing (hbo). Vocational nurse refers to individuals who obtained a vocational degree in nursing (mbo).*

Figure 2 illustrates our estimates of the hidden reserve of healthcare workers obtained from the Labor Force Survey (LFS). As explained in Section 2, we used the LFS data to obtain an estimate of the size of the hidden reserve among individuals who obtained their diploma before the period in which Statistics Netherlands started registering diplomas. We restricted the sample to individuals who obtained their hbo (bachelor) nurse or midwife diploma before 2000 and to individuals who obtained their mbo (vocational) nurse or midwife diploma before 2004. In Figure 2, we observe that the percentage of workers who were employed in the healthcare sector on 31 December 2022 is substantially lower in the LFS data than in the register data. Among bachelor-trained nurses and midwifes, only 48.1% worked in the healthcare sector. This percentage is even lower among nurses trained in vocational education, namely 39.6%. The fact that the estimated hidden reserve is substantially lower when obtained from the LFS data can be explained by the fact that the analyses concern older cohorts that experienced more time since graduation.

**Figure 2. Labor market status healthcare workers end of 2022 according to LFS data**



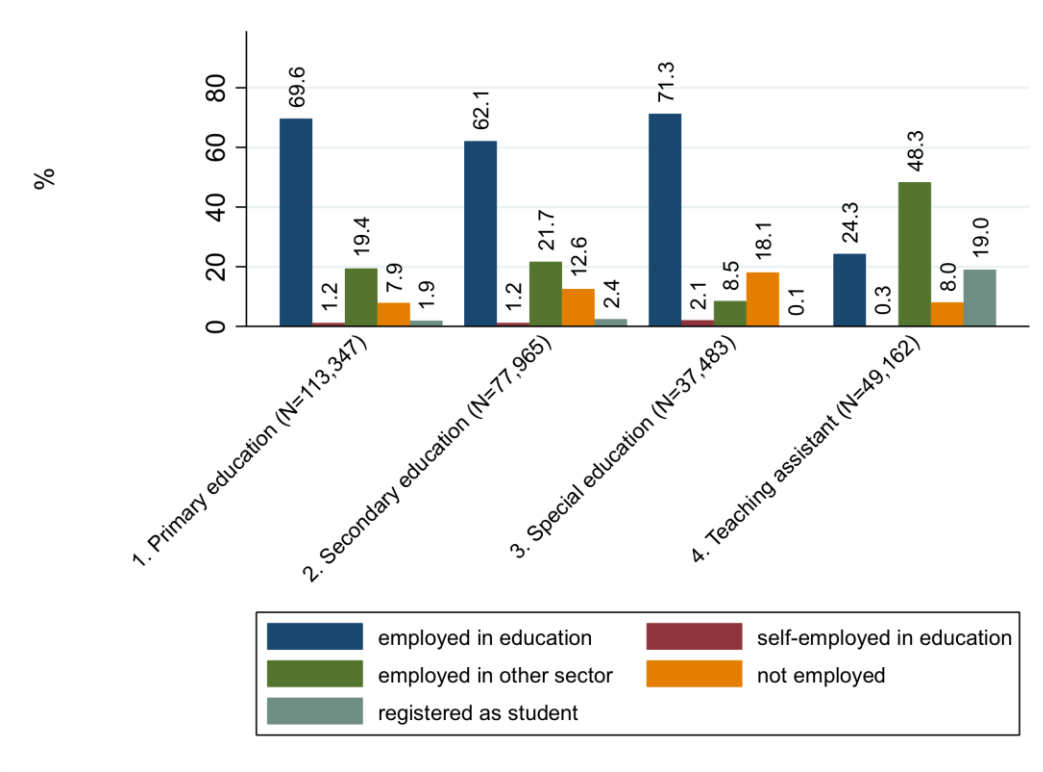

***Notes:*** *Bachelor nurse refers to individuals who obtained a bachelor degree in nursing or midwifery (hbo). Vocational nurse refers to individuals who obtained a vocational degree in nursing or midwifery (mbo). This figure does not depict the percentage of workers who are registered as a student due to a disclosure risk resulting from a low number of observations.*

Table 1 shows the average number of hours worked per occupational group in the healthcare sector. The smallest number of working hours is observed among healthcare assistants who work on average 22.9 hours per week, followed by nurse assistants with 25 hours, and vocational trained nurses with 27.6 hours. Bachelor-trained nurses work the largest number of hours per week, namely 29.2 hours. If all part-time workers in salaried employment would decide to work full-time (i.e. 36 hours per week), this would result into almost 12,000 full-time jobs among bachelor-trained nurses, nearly 14,000 jobs among vocational-trained nurses, more than 24,000 jobs among nurse assistants, and almost 22,000 jobs among healthcare assistants.

In Figure 3, we show the percentage of individuals with a teaching diploma who are employed in the education sector. We distinguish between individuals who have been qualified to work in primary education (N=113,347), secondary education (N=77,965), special education (N=37,483), and those who have a teaching assistant diploma (N=49,162). For all four groups, the size of the hidden reserve is substantial. The relative size of the hidden reserve is largest for teaching assistants (75.3%) and secondary school teachers (36.7%).

In Figure 4, we show estimates of the size of the hidden reserve for teachers based on the LFS data. Again, we restricted the sample to individuals who acquired their diploma before 2000. The LFS data does not allow us to distinguish between individuals who have been trained as a primary school or special education teacher, and those who have been trained as a secondary school or vocational subject teacher. We are also not able to identify graduates with a teaching assistant diploma. Like for healthcare graduates, the hidden reserve appears to be much larger when using the LFS data. The share of the hidden reserve is 68% among graduates who have been trained as a primary school or special education teacher and 81.6% among those who have been trained as a secondary school or vocational teacher.

**Figure 3. Labor market status education workers end of 2022 according to register data**

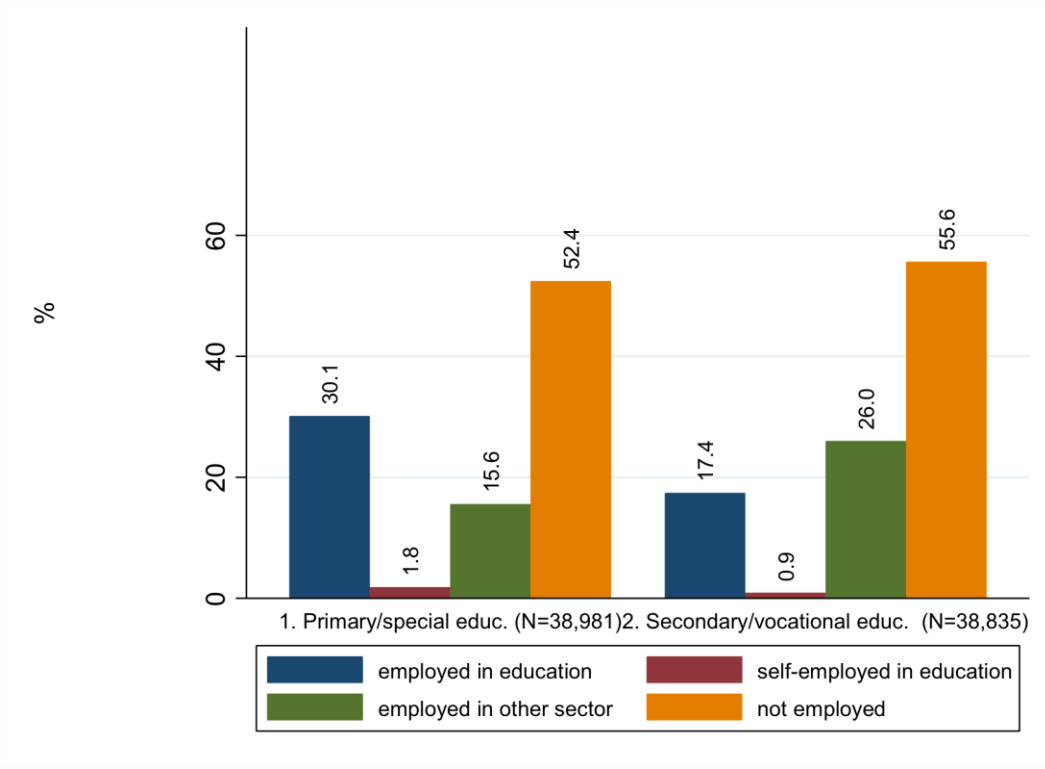



***Notes:*** *Primary education, secondary education, and special education refer to individuals who obtained a diploma to teach respectively teach in each of these three sectors respectively. This figure does not depict the percentage of workers who are registered as a student due to a disclosure risk resulting from a low number of observations.*

In Figure 5, we provide a more detailed distinction between different types of teachers based on the register data. The largest relative hidden reserve is observed for second-degree teachers of other languages (75.3%), and smallest for first-degree teachers of other languages (17.6%).

Table 1 shows the average number of working hours per occupational group in the education sector. Teaching assistants work the lowest number of hours per week, namely 28.9 hours. Secondary-, primary-, and special education work a comparable number of hours per week, approximately 30 hours. If all part-time workers in salaried employment would decide to work full-time (i.e. 36 hours per week), this would result in more than 8,000 full-time jobs among secondary school teachers, more than 13,000 jobs among primary school teachers, over 4,000 jobs among special education teachers, and more than 2,000 jobs among teaching assistants.

**Figure 4. Labor market status teachers end of 2022 according to LFS data**



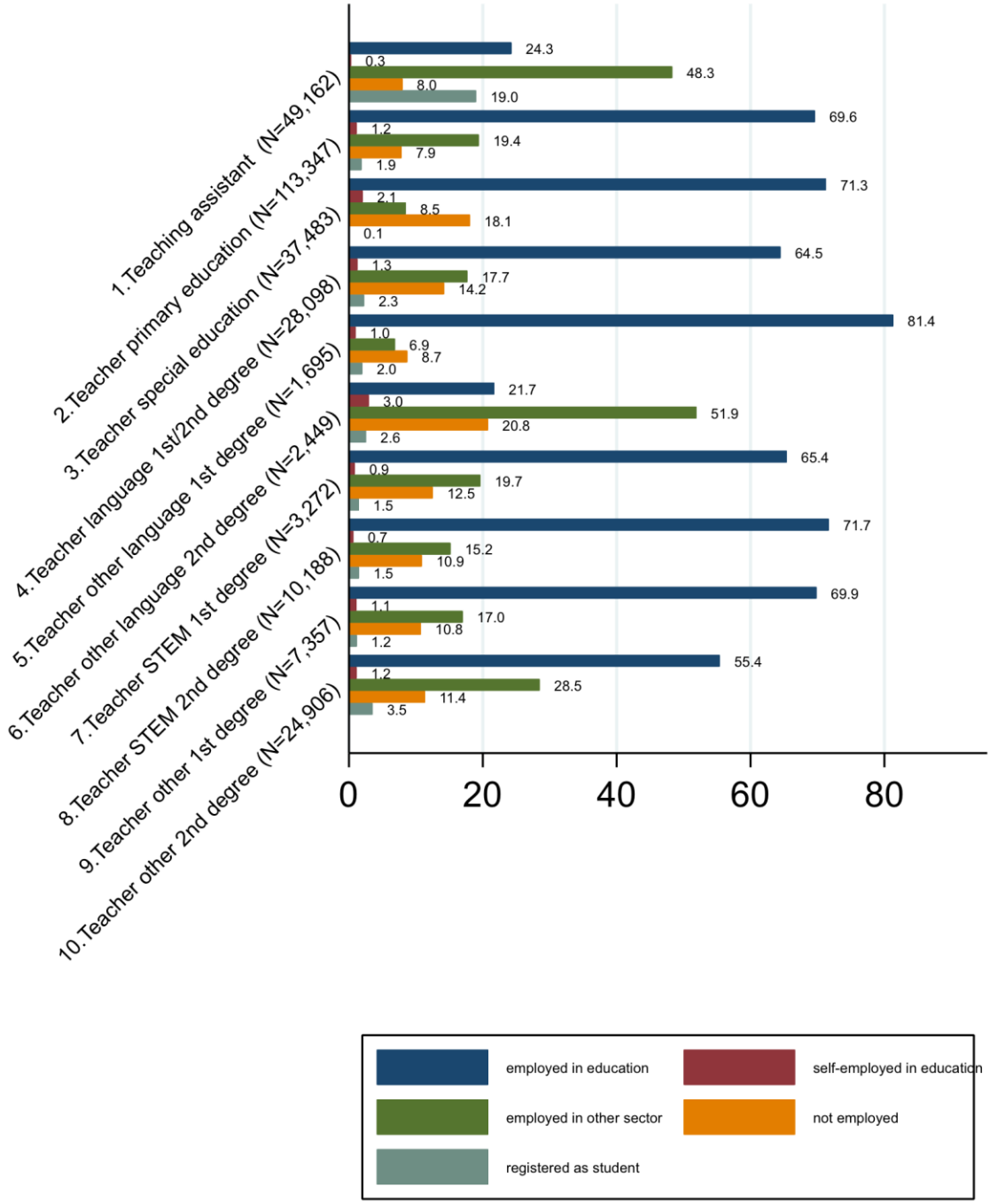

***Notes:*** *Primary education, secondary education, and special education refer to individuals who obtained a diploma to teach in each of these three sectors respectively. This figure does not depict the percentage of workers who are registered as a student due to a disclosure risk resulting from a low number of observations.*

**Table 1: Average number of working hours of healthcare- and education workers**

| Education diploma | Average number of working hours per week |
|---|---|
| Healthcare assistant | 22.9 |
| Nurse assistant | 25.0 |
| Vocational-trained nurse | 27.6 |
| Bachelor-trained nurse | 29.2 |
| Secondary education teacher | 30.4 |
| Primary education teacher | 29.8 |
| Special education teacher | 29.9 |
| Teaching assistant | 28.9 |

***Source:*** *Register data Statistics Netherlands.*

**Figure 5. Labor market status by teacher type end of 2022 according to register data**




***Notes:*** *Language teachers teach one of the mandatory languages and that schools are required to offer, i.e. Dutch, English, French and German. Other language teachers teach a language other than the four languages listed above including Spanish or Italian. STEM teachers teach math, physics or chemistry. Other subject teachers teach subjects including history, geography and biology. First-degree teachers are allowed to teach all grades in vmbo, havo and vwo, while second-degree teachers are restricted to teach all vmbo grades and the first three grades of havo and vwo.*

### 4.2 Working conditions

We used the Netherlands Working Conditions Survey (in Dutch: NEA) to identify differences in the working conditions of workers who are employed in the healthcare or education sector and workers who are part of the hidden reserve.

Figures 6a and 6b show how workers with a nursing-diploma assess various aspects of their job. The aspect “autonomy” refers to the percentage of workers who regularly experience independence in their job. Among workers employed in the healthcare sector, 26.2% (*N*=8,350) reports to regularly experience independence. Workers in the hidden reserve, on the other hand, more often regularly experience independence, namely 35.7% (*N*=4,045).

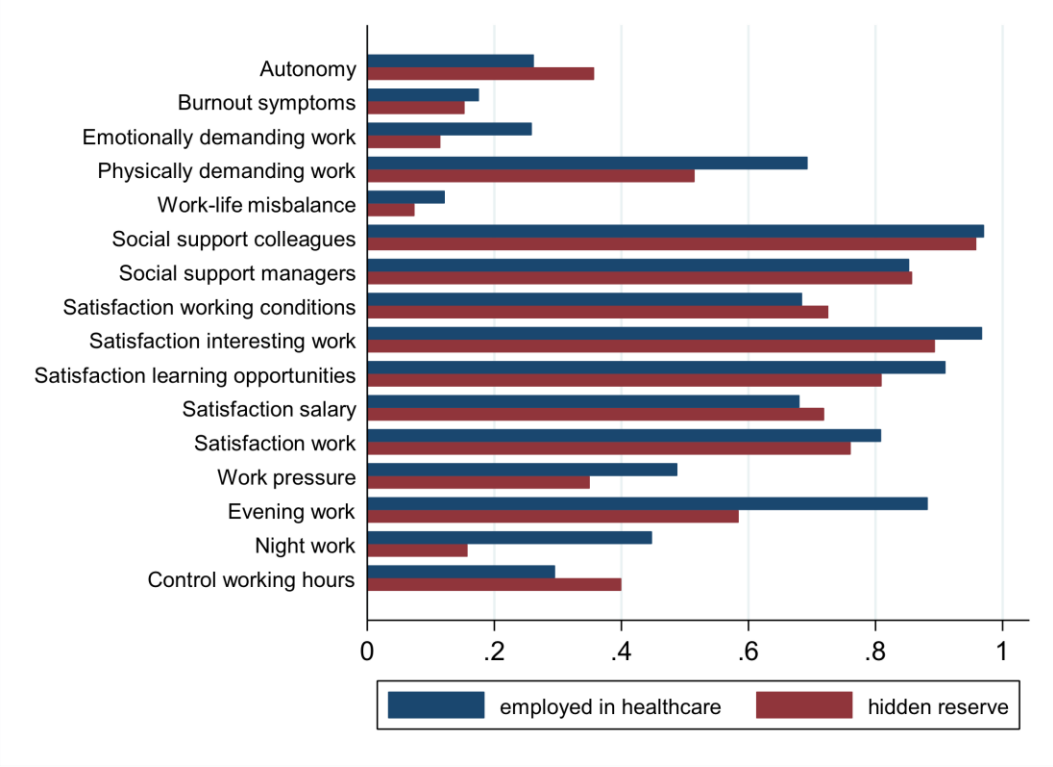
Moreover, nurses more often report to (often or always) perform emotionally (25.9%, *N*=8,365) or physically demanding work (69.3%, *N*=8,377) than workers in the hidden reserve (“emotionally demanding”: 11.5%, *N*=4,048; “physically demanding”: 51.5%, *N*=4,051).

When it comes to working hours, we observe that nurses more often report to sometimes work in the evening (nurses: 88.2%, *N*=8,365; hidden reserve: 58.5%, *N*=4,049) and at night (nurses: 44.8%, *N*=8,344; hidden reserve: 15.8%, *N*=4,043), and more often work overtime (nurses: 2.93 hours/week, *N*=8,115; hidden reserve: 2.39 hours/week, *N*=3,896). At the same time, workers in the hidden reserve more often indicate that they can determine their own working ours (40.0%; *N*=4,040) compared to nurses (29.5%, *N*=8,339).

Healthcare workers also more frequently indicate that they often or always face work pressure (nurses: 48.8%, *N*=8,356; hidden reserve: 35.0%, *N*=4,044) and to (very) often experience a work-life misbalance (nurses: 12.2%, *N*=8,344; hidden reserve: 7.4%, *N*=4,024). Nurses are also more likely to experience burnout symptoms (nurses: 15.3%, *N*=8,384; hidden reserve: 17.6%, *N*=8,384), and were more often absent at work in the past twelve months (nurses: 1.42 days; *N*=8212; hidden reserve: 1.21 times; *N*=3,977).

Furthermore, workers in the hidden reserve are more often (very) satisfied with salary (71.9%, *N*=3,986) compared to nurses (68.0%, *N*=8,279) as well as with their working conditions (hidden reserve: 72.6%, *N*=4,036; healthcare workers: 68.4%, *N*=8,358).

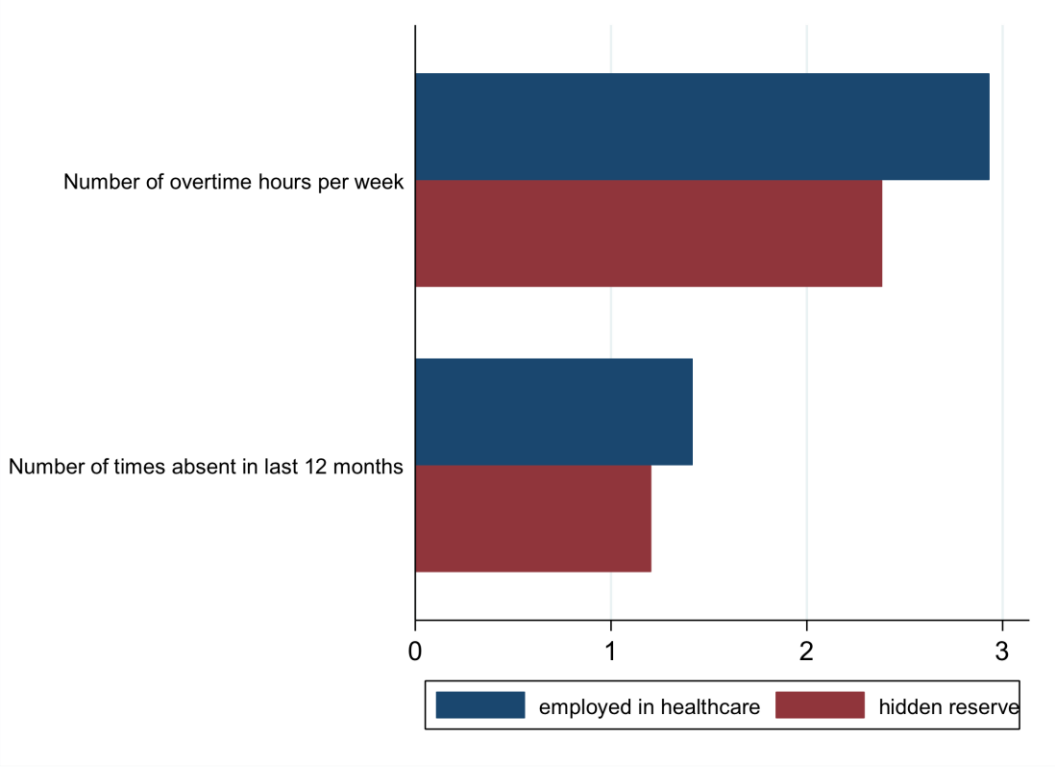
**Figure 6a. Perceived working conditions among nurses and workers in the hidden reserve (binary variables)**




***Notes:*** *The figure shows how workers in each category (employed in healthcare or hidden reserve) perceive different aspects of their job. We recoded the original categorical variables into binary variables. The figure shows the percentage of workers reporting a value of 1 (the meaning of a value of 1 for a specific variable is reported in the text). The difference between workers in the healthcare sector versus workers in the hidden reserve is always statistically significant (at the 1% level), except for the difference in the perceived social support received from managers.*

There are several aspects that are more positively perceived by nurses than by workers in the hidden reserve. Nurses more often report to be (very) satisfied with the extent to which their job is interesting (nurses: 96.8%, *N*=8,279; hidden reserve: 89.3%, *N*=3,989), with the learning opportunities in their job (nurses: 91.0%, *N*=8,269; hidden reserve: 81.0%, *N*=3,974), and with the social support they receive from colleagues (nurses: 97.1%, *N*=8,201; hidden reserve: 95.9%, *N*=3,868). There is no significant difference in the perceived social support received from managers (nurses: 85.3%, *N*=7,935; hidden reserve: 85.8%, *N*=3,862). Interestingly, nurses indicate more often to be (very) satisfied overall with their job (80.9%, *N*=8,365) than workers in the hidden reserve (76.1%, *N*=4,033).

**Figure 6b. Perceived working conditions among nurses and workers in the hidden reserve (continuous variables)**



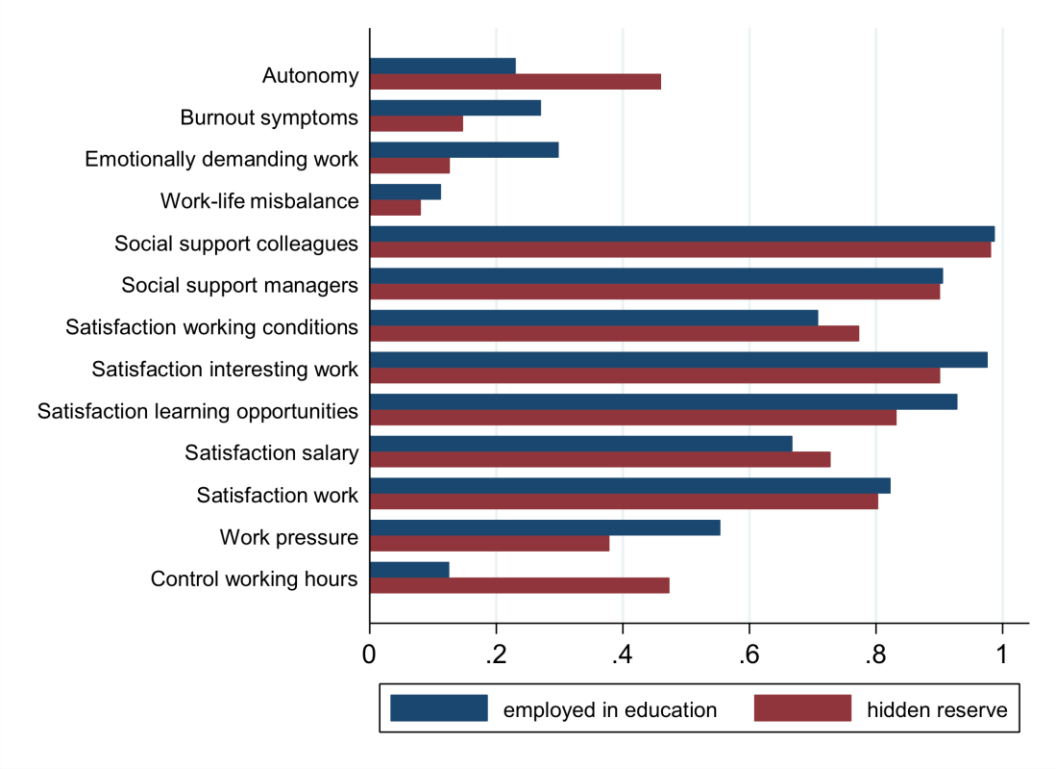

***Notes:*** *The figure shows how workers in each category (employed in healthcare or hidden reserve) perceive different aspects of their job. The difference between workers in the healthcare sector versus workers in the hidden reserve is always statistically significant (at the 1% level).*

Figures 7a and 7b illustrate how the various job aspects are perceived by workers with a teacher training. Among workers employed in the education sector, 12.6% (*N*=13,793) reports to regularly experience autonomy when performing their work, compared to 47.4% (*N*=6,478) of the workers in the hidden reserve. Teachers also more often indicate to perform (often or always) emotionally demanding work (teachers: 29.9%; *N*=13,828; hidden reserve: 12.7%; *N*=6,502).

Similar to the healthcare sector, workers in the hidden reserve can more often determine their own working hours (47.4%; *N*=6,478) than teachers (12.6%; *N*=13,793). Moreover, teachers face more work pressure (teachers: 55.4%, *N*=13,822; hidden reserve: 37.9%, *N*=6,502), more frequently indicate to (very) often experience a work-life misbalance (teachers: 11.3%, *N*=13,826; hidden reserve: 8.1%, *N*=6,518) and burnout symptoms (teachers: 27.1%, *N*=13,859; hidden reserve: 14.7%, *N*=6,535), and were more often absent at work in the past twelve months (teachers: 1.7 days; *N*=6,352; hidden reserve: 1.3 times; *N*=6,463).

Workers in the hidden reserve are also more often (very) satisfied with their salary (72.8%, *N*=6,466) than teachers (66.8%, *N*=13,802), as well as with their working conditions (hidden reserve: 77.3%, *N*=6,517; teachers: 70.8%, *N*=13,842).

**Figure 7a. Perceived working conditions among teachers and workers in the hidden reserve (binary variables)**

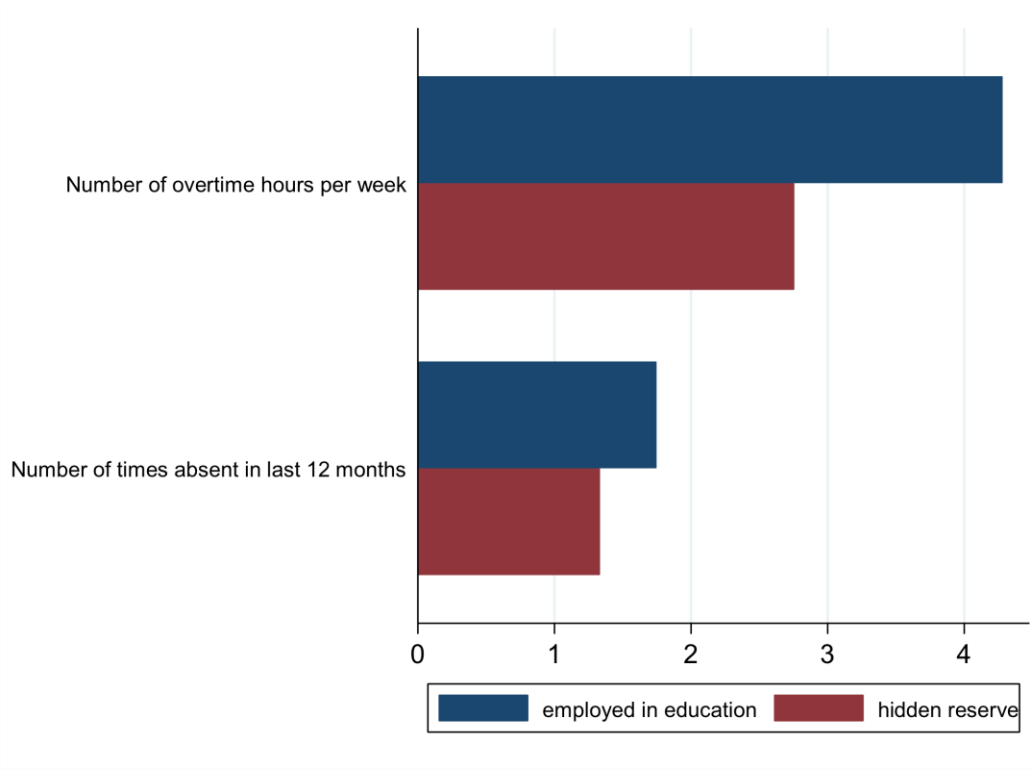



***Notes:*** *The figure shows how workers in each category (employed in education or hidden reserve) perceive different aspects of their job. We recoded the original categorical variables into binary variables. The figure shows the percentage of workers reporting a value of 1 (the meaning of a value of 1 for a specific variable is reported in the text). The difference between workers in the education sector versus workers in the hidden reserve is always statistically significant (at the 1% level), except for the difference in the perceived social support received from managers.*

There are several aspects that are on average more positively perceived in teachers' jobs than among workers in the hidden reserve. Teachers more often report to be (very) satisfied with the extent to which their job is interesting (teachers: 97.6%, *N*=13,776; hidden reserve: 90.1%, *N*=6,453), the learning opportunities in their job (teachers: 92.9%, *N*=13,768; hidden reserve: 83.2%, *N*=6,456), and the social support they receive from colleagues (teachers: 98.8%, *N*=13,758; hidden reserve: 98.2%, *N*=3,868). There is no significant difference in the perceived social support from managers (teachers: 98.8%, *N*=13,758; hidden reserve: 98.2%, *N*=6,405). Interestingly, teachers indicate more often to be

(very) satisfied overall with their job (82.3%, *N*=13,851) than workers in the hidden reserve (80.3%, *N*=6,516).

**Figure 7b. Perceived working conditions among nurses and workers in the hidden reserve (continuous variables)**




***Notes:*** *The figure shows how workers in each category (employed in education or hidden reserve) perceive different aspects of their job. The difference between workers in the education sector versus workers in the hidden reserve is always statistically significant (at the 1% level).*

## 5. Discussion and conclusion

Like many other countries, the Netherlands faces a structural shortage of healthcare workers and teaching staff. At the same time, both professions encounter challenges in retaining workers, with a considerable number of nurses and teachers exiting their respective fields. The first aim of this study was to estimate the hidden reserve among individuals who are qualified to work in the healthcare or education sector. The second aim was to provide insight into the reasons why nurses and teachers leave the profession. For this purpose, we examined the perceived working conditions for workers in the healthcare and education sector compared to those in the hidden reserve.

Using registry data, we show that the hidden reserve of healthcare and education workers is substantial. The hidden reserve among bachelor-trained nurses who graduated after 2000 yields nearly 17,000 fte, while the shortage of bachelor-trained nurses and midwifes ranged between 5,800 and 6,000 fte in 2023 (Tweede Kamer, 2023a). Similarly, the hidden reserve among vocational-trained nurses (i.e. almost 11,000) exceeds the estimated shortage of 8,300 to 8,700 fte. The hidden reserve of nurse assistants (i.e. nearly 24,000) is more than twice as large as the estimated shortage, which yielded 9,700-10,100 fte in 2023. Likewise, the hidden reserve among graduates with a teaching diploma is substantially higher than the current shortages. In primary education, the shortage was estimated to be 9,800 fte at the end of 2023 while the hidden reserve yielded more than 33,000 fte (Adriaens, Elshout & Elshout, 2023; Den Uijl et al., 2023). The same holds for secondary education where the estimated shortage was 3,800 fte at the end of 2023 and the hidden reserve was almost 29,000 fte.

The hidden reserve is also significant among part-time workers. If all part-time workers in the aforementioned occupational groups would decide to work 36 hours per week, the resulting increase in fte positions would exceed the current shortage. However, motivating part-time workers to increase their working hours is not straightforward. Most nurses and teachers are female and often have caregiving responsibilities for children. Increasing the number of childcare days is often difficult due to a shortage of childcare workers and because the cost of childcare frequently outweighs the additional income earned from working more hours. Additionally, Dutch healthcare workers often provide informal care to relatives and acquaintances (Statistics Netherlands, 2024), further limiting their ability to increase their labor supply. On average, nurses and teachers work as many or more hours than the average Dutch woman, who works 27.8 hours per week (Statistics Netherlands, 2024). Additionally, the high marginal tax rate reduces the incentive to work more hours.

Our analyses of the Netherlands Working Conditions Survey reveals that workers in the hidden reserve perceive many aspects of their job more positively than workers employed as a nurse or teacher. For example, workers in the hidden reserve suffer less from burnout symptoms, perceive their work to be less emotionally and physically demanding, less often experience a misbalance between work and life, experience less work pressure, and indicate to have more control over their working hours. Moreover, workers in the hidden reserve appear to be more satisfied with the extent to which they have autonomy in their job and with their salary. Interestingly, compared to hidden reserve workers, nurses and teachers are more satisfied with the extent to which their job is interesting, with the learning opportunities in their job, and with their overall job satisfaction. The observation that nurses and teachers exhibit higher overall job satisfaction could be explained by the alignment between their

employment and their (vocational) training, allowing them to effectively utilize their skills and knowledge in their chosen professions.

The results of our analyses suggest that the staff shortages in healthcare and education could at least partly be reduced by activating the hidden reserve. The reintegration of inactive nurses and teachers, and the extension of working hours, is also time and cost efficient as it eliminates the necessity to invest in long education trajectories. The analyses of the working conditions for teachers and nurses, compared with those of workers in the hidden reserve, suggest several potential solutions to encourage the re-entry of inactive nurses and teachers into their respective professions.

Firstly, the discrepancy in working conditions indicates that nurses and teachers face relatively high levels of work pressure. Similarly, Van Casteren et al. (2023) found in their interview study that work pressure is the most frequently cited reason for Dutch teachers leaving the teaching profession or education sector. Hence, reducing work pressure might be an effective strategy to motivate workers in the hidden reserve to return to the healthcare or education sector. Second, providing nurses and teachers with more control over their working hours might improve the attractiveness of the profession and result into a better work-life balance of workers. This will especially hold for workers with family responsibilities. A recent discrete choice experiment conducted in the Netherlands shows that flexibility in working hours can increase the likelihood that former teachers re-enter the teaching profession (Cobben, Cörvers & Montizaan, 2023). Third, our analyses also suggest that financial incentives might be a viable strategy to stimulate workers to re-enter the nursing or teaching profession. Cobben et al. (2023) show that a structural wage increase affects former teachers' likelihood to re-enter the teaching profession. Financial incentives, including a temporary bonus for working additional hours, can also motivate part-time workers to work more hours (van Casteren et al., 2023). Finally, our analyses suggest that increasing the autonomy in nurses' and teachers' job will make the profession more attractive and increase workers' intention to activate the hidden reserve.

Despite the potential of the hidden reserve to alleviate nurse shortages in the Netherlands, the ease of activating this reserve may vary across regions. The largest hidden reserves are observed in the densely populated cities in the Netherlands. Teachers and nurses might be more likely to exit the nursing and teaching professions in these regions due to a large number of outside alternatives in the local labor market. Moreover, despite their larger populations, these urban areas often possess smaller hidden reserves relative to their size (Van Merode et al., 2024), potentially resulting in higher levels of work pressure. As a result, the capacity to incentivize inactive nurses and teachers to re-enter the healthcare or education sector may vary by region.

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## Appendix A

**Figure A.1: The Dutch education system**