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Effects of mandatory military and alternative community service on wages and other socioeconomic outcomes

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Abstract

In this paper, we estimate the effects of mandatory military and alternative community service by exploiting the post-cold war decrease in the need for soldiers causing a substantial number of potential conscripts not to be drafted into the German military. The study is based on retrospective survey information for 655 men from the 1970 to 1984 birth cohorts collected in 2009/10 and after, using previously unavailable information on degree of fitness in the military's medical exam as a control variable. We test for the effects of mandatory service on wages, employment, volunteer work, marriage/partnership status, and satisfaction with various aspects of life. Whilst many estimates are not statistically significant, for the younger birth cohorts 1976 to 1984, we find some evidence of a lower hourly wage due to mandatory military service, which shows a negative point estimate of −15% with a large confidence interval of between −30 and −0.2%. This interval estimate is consistent with previous findings for the United States, Denmark, and the Netherlands. However, we also find statistically significant estimates for both military and alternative community service to increase participation in volunteer work, a hitherto rarely explored effect.

1 | INTRODUCTION

Mandatory military service (also known as conscription or the draft) has been widespread in industrialized countries even in the post-World War II period, although it has seen a significant decline since, with most North American and European countries moving to professional armies. Conscription ended in Britain in 1960, in the United States in 1973, in France in 2001, and in Germany in 2011. Despite of a decline in the use of conscription over the last decades, it is still in use, also in some highly-developed economies (Tarabar & Hall, 2016). Across the world, however, 94 of the 179 countries for which data are available still practice conscription (Galiani et al., 2011).

One consequence of conscription is that by levying a tax in kind through involuntary labor, it imposes costs on the participants that are not accounted for in national budgets (Oi, 1967). It also imposes a career break for those affected, which may have negative long-run effects on labor market outcomes. That is, women's early career breaks for childbirth lead to between-gender differences in the timing of work experience accumulation that account for 12% of the gender wage gap (Light & Ureta, 1995). It is thus worth asking whether, analogously, the interruption in education and work experience caused by conscription also has a negative effect on male wages.

In this paper, we investigate this possibility by estimating the effects of mandatory military service in Germany using an identification strategy that exploits the results of medical exams carried out by the military. Apart from the identification strategy, a further novelty of the paper is that we exploit a rich set of outcome variables, including participation in volunteer work, which has received very little attention in the literature.[1] The military's test results, although key to whether a youth is drafted or not, are seldom included in socioeconomic surveys and generally unavailable as administrative data. Their availability through our data source thus offers an exceptional opportunity not open to any of the studies reviewed below, and so to the best of our knowledge, we are the first to use such information in our identification strategy. Specifically, we draw on the previous literature on the development of the German army (Tobiassen, 2001, 2005), which documents the reduced demand for conscripts after the fall of the Iron Curtain. As a result, we consider (not) being drafted conditionally on having completed the secondary schooling track and satisfactorily undergone the military exam to be almost random.

By applying this strategy to the complete sample, we produce confidence interval estimates indicating that compulsory military service has an effect on conscripts' post-service hourly wages of between −20 and +4% and between −30 and −0.2% for the subsample of men born 1970–1984 and 1976–1984, respectively. Both estimates control for actual work experience. Admittedly, because of the small sample size, these confidence intervals are large, and only the second is associated with a point estimate significantly different from zero. Nevertheless, these intervals mirror previous instrumental variable estimates reported for the U.S. by Angrist (1990), and Angrist et al. (2011), for the Netherlands by Imbens and van der Klaauw (1995) and Hubers and Webbink (2015), and for Denmark by Bingley et al. (2020). Mouganie (2020) finds no significant estimates for France, but some point estimates for wages for high socio-economic status (SES) men are −4.8 and −2.7% despite significantly positive effects on education for this group, which can be explained by conscription deferral.

Most of the recent literature evaluating the effects of mandatory military service is microeconomic, employing natural experiments to evaluate the effect of mandatory military service on wages and other outcomes like employment, completed education, health or crime. One exception is the macro-level study by Keller et al. (2009), who use country fixed-effects regressions for 21 industrialized countries to show that conscription—measured as a binary indicator for the length of conscription and the share of conscripts in the labor force—is negatively associated with both GDP levels and GDP growth. Similarly, Lau et al. (2004) use a calibrated general equilibrium model to demonstrate that the draft may lower GDP not only through direct allocative inefficiencies but also indirectly through dynamic effects arising from less human capital accumulation and less physical capital accumulation through lower

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[1]Grünhaus et al. (2021) consider alternative community service and subsequent volunteer work. Other studies, for example Gallant et al. (2010) or Yang (2017) consider less intensive mandatory community service during high school and later volunteering, with mixed results.

savings. Similar arguments are outlined theoretically in Poutvaara and Wagener (2007), whose authors argue that collecting taxes to run an all-volunteer army creates fewer economic distortions than the draft.

On the microeconomic level, Angrist (1990) uses the Vietnam draft lottery as an instrumental variable for service in the U.S. army during the Vietnam war, which involved a median service length of 37 months and potential exposure to combat. The author finds a 15% reduction in earnings 10 years after service for white males (i.e., at around age 30), which amounts to a loss of about 2 years of work experience, somewhat less than the median length of military service. By age 50, however, the negative wage differential between veterans and nonveterans has disappeared. In an update using richer data sets, Angrist et al. (2011) essentially confirm previous results but find that wages for veterans and nonveterans of the Vietnam war actually converge by age 40. For a peacetime conscription of 14 months in the Netherlands (versus 37 months in Vietnam), Imbens and van der Klaauw (1995) find a 5% reduction in annual earnings 10 years after service using "special exemptions granted" and "proportion served" by cohort as instrumental variables.

These negative estimates for wage effects of compulsory military service in the U.S. and Netherlands, however, contrast with findings for Germany, Portugal, and the U.K. For example, Bauer et al. (2012) use a regression discontinuity design to exploit the 1955 reintroduction of the draft in Germany. While admitting that their regression discontinuity estimates are not very precise, having a standard error of 0.29 log points on a point estimate of 0.09 log points, they detect no statistically significant effect of mandatory military service on lifetime earnings, lifetime daily wage, or lifetime days of employment. Likewise, Paloyo (2010), applying a difference-in-differences approach with women as the comparison group to this same natural experiment, detects no significant effects of compulsory military service on log average daily wages.

Grenet et al. (2011) exploit a similar natural experiment, the 1960 abolishment of conscription in the UK. They apply a regression discontinuity design to cohorts born in 1940 or after, who were not drafted. The authors find no effects of compulsory military service on log hourly earnings. With a point estimate of 0.034 log points and a standard error of 0.035 log points, they argue that their small and insignificant estimates might be explained by the fact that in the 1950s/60s, most conscripts received little education or training in civilian life, leaving school mostly at age 14 or 15. Military conscription might thus have had two opposing and neutralizing effects: the positive effect of providing some training and the negative effect of lost work experience in the civilian labor market.

This hypothesis is reflected in the findings of Card and Cardoso (2012) for Portugal: for low-skilled conscripts born in 1967, they find an increase in log hourly wages of about 4% for the 2002–2009 period, which is statistically significant in the difference-in-differences estimates. It should be noted, however, that the low-skilled workers in this study had a maximum of only 4 years of education. Given Portugal's late return to democracy in 1975, the situation analyzed might thus have resembled that in Germany or the UK a few years after World War II. Moreover, when they consider all conscripts, the authors detect no statistically significant wage effects of compulsory military service in Portugal.[2]

Our paper is structured as follows: Section 2 describes key features of Germany's mandatory military service up until 2011. Section 3 describes our unique data source, which contains the outcome of the military's medical exam. Section 4 reports the regression estimates of mandatory military and alternative community service's effects on wages, employment, volunteer work, and marriage/partnership status, as well as on indicators of satisfaction with various aspects of life. Section 5 concludes the paper.

2 | MANDATORY MILITARY AND ALTERNATIVE COMMUNITY SERVICE IN GERMANY

Germany's post-war military was based on conscription, which was effectively abolished in 2011. After the 1989 fall of the Iron Curtain, the German military's demand for conscripts decreased much faster than the supply, so an

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[2]There is also a literature on the effects of military service on education, crime, and health, which we do not review here.
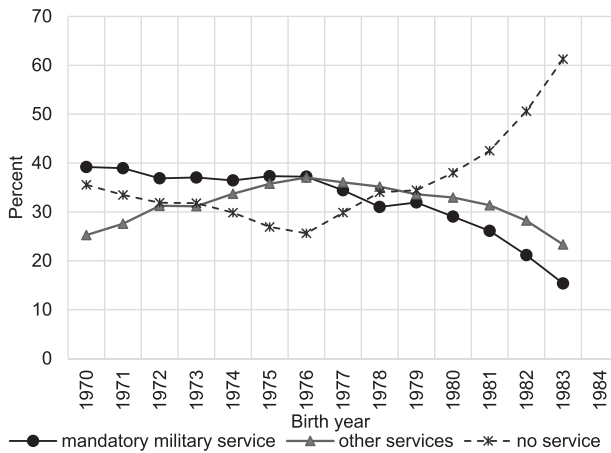
FIGURE 1 Share of service participation by birth year. *Note:* "Other services" include the community service as an alternative to the military service; this service can take various forms which are combined here. "No service" also includes several groups; for example, men not fit for service, as well as men granted an exemption from service *Source*: Tobiassen (2001, 2005); author calculations

**TABLE 1** Degrees of fitness assigned by the German military

Abbreviation	Explanation
T1	Fit for all activities
T2	Fit with restrictions for certain activities
T3	Fit with restrictions for basic training and certain activities
T4	Temporarily not fit for service or deferred
T5	Not fit for service
T7	Since 1995: fit for certain activities of basic service with exemption from basic training

Note: T6 also exists and is designated ex post to reservists with a T3 degree of fitness.
Source: BGB1 (1995), Tobiassen (2001).

increasing number of young men available for military service were not drafted (see Tobiassen, 2001, 2005, for a discussion of this situation's effect on 1970–1982 birth cohorts). In Fig, 1, we borrow data from Tobiassen (2001, 2005) to illustrate the share of young men in the 1970–1983 birth cohorts who (i) served in the military, (ii) performed alternative community service (such as service in hospitals, care homes, relief organizations or institutions supporting youth), or (iii) did not serve because they were not drafted or were deemed medically unfit. As the figure shows, whereas the share of men not serving is around 30% for the earlier cohorts, it increases steadily from the 1976 birth cohort onward to reach over 60% for the 1983 cohort.

In this paper, we regard (not) being drafted conditional on age, schooling, and medical exam result as an almost random event that we exploit to estimate the effects of peacetime military service on the labor market and family-related outcomes. As documented in Tobiassen (2001) and illustrated in Figure 1, a 1995 reform of the military's medical exam procedure, together with the decreasing demand for soldiers, led to an increasing share of potential conscripts (i.e., men considered medically fit for service) born in 1976 and after not being drafted. For this reason, we also present separate estimates for cohorts born before and after 1976.

Most young men (around 90% according to our data) had to appear for the military's medical exam while in high school or in the apprenticeship system. This medical exam classified each individual into one of several degrees of fitness (*Tauglichkeitsgrad*), listed in Table 1. Only those in the three highest categories of fitness (T1, fit for all activities;
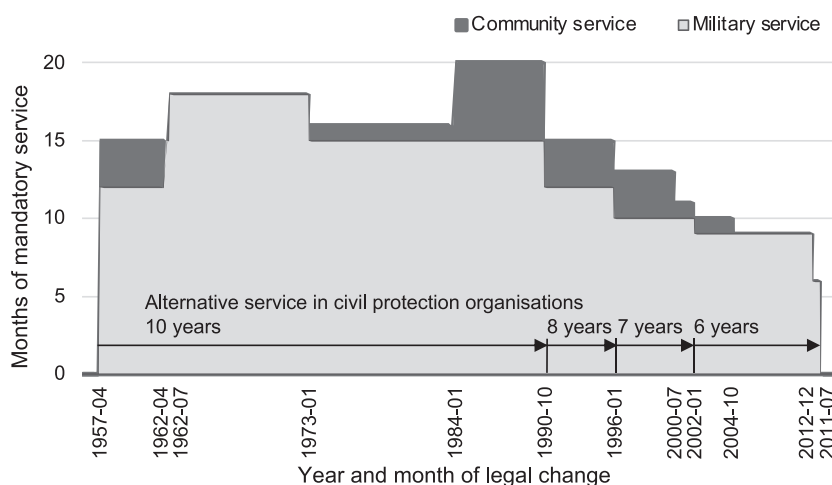
FIGURE 2 Duration of mandatory military or alternative community service by calendar time.
Source: BGB1 (1990, 1994, 1995); Author illustration

T2, fit but with restrictions for certain activities; and T3, fit with restrictions for basic training and certain activities) were considered ready for drafting although not necessarily drafted.[3] Those in the T4 category, temporarily unfit, could be reexamined later, but those in the T5 category were considered unfit for service and so not drafted into either the military or the community service alternative.

To ensure that our study is built on a natural experiment in which (not) being drafted is almost random, we restrict our sample to young men with T1, T2, and T3 degrees of fitness. Because T3 is the lowest category, we expect this group to be the least attractive for the military and hence the least susceptible to being drafted. We thus use degree of fitness as a control variable in the regressions. Additionally, because anecdotal evidence, unreported regression estimates, and our sample means (Table 3) indicate that the German military was more likely to draft young men from the higher educational schooling track, we also control for the secondary schooling track.[4]

Draft age depended on schooling track (see Figure A1 in the Supporting Information for the distribution): young men who had completed the highest track were usually drafted after high school at around age 19 or 20. Those from the other tracks typically finished their apprenticeship training before being drafted at 20 or 21. Service duration was longer for earlier cohorts and then decreasing over time. Before the end of the cold war, the duration was 15 months, which was reduced to 12 months in 1990 and then lowered again to 10 months and 9 months in 1996 and 2000, respectively. The community service alternative usually lasted a few months longer than the military service (see Figure 2 for durations over time). Conscripts also had the option, however, of signing up for a longer period of service, meaning that our "treatment" (mandatory military service) may have caused longer exposure to the military in several cases. Figure A2 in the Supporting Information, which plots the distribution of the number of months served in the military (censored at 30 months for presentational reasons), shows that a significant number of young men decided to stay in the military longer than required.

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[3]In 1995, T7 was introduced to indicate that a young man could do some service for the army but not participate in basic training. However, since January 2001, men with this degree of fitness have no longer been drafted. T6 denotes reservists with a T3 degree of fitness.

[4]Apart from relying on formal education and its medical examination, the German military also carried out a test similar to the Armed Forces Qualification Test (AFQT) (*Eignungstest*). Unfortunately, these results are not included in our data. In fact, as far as we know, the exact results of this test, unlike those of the medical exam, were not even passed on to the examinees.

3 | DATA

We use data from Germany's recently created National Educational Panel Study (NEPS, see Blossfeld et al., 2011, for a general description of this data set). For our purposes, we use Starting Cohort 6–Adults (Adult Education and Life-long Learning), which contains self-reported retrospective information on the degree of fitness assigned in the military's medical exam and on mandatory military service participation, as well as labor market and demographic information. We derive our outcome variables using these data: wages, employment status, volunteer work, ever having been married, whether currently married or currently living in a partnership, and satisfaction with various aspects of life.

Table A1 outlines the sample selection process beginning with the NEPS Starting Cohort 6 of 2009/2010, which contains 11,649 observations, 5,714 of them male. Restricting our analysis to West German men, then reduces the sample size to 4,155. The key variable for the natural experiment is the degree of fitness in the military's medical exam, which only applies to the cohorts born after 1970 (aged 26 to 40 at the time of interview). This restriction lowers the sample size to only 893 because when these cohorts were born, Germany was experiencing a low birth rate (see Figure A3 Supporting Information). These cohorts (especially those born after 1976) are the core of our natural experiment because a drastically decreasing demand for German military conscripts in the immediate post-cold war period (1990–2004) meant a high chance that these individuals would not be drafted (see Section 2).

In addition to restricting the sample to West German men aged 26 to 40 ($N = 893$), we must also restrict it to those classified as fit for service who have valid entries for the key variables. The result is 702 observations with available data on employment and marital/partnership status (see Table 2). Of these 702 observations, 678 have their fitness classification from the military's medical exam recorded, but only 654 meet the T1, T2, and T3 criterion for being drafted.[5] Of these 654 men, 297 completed their military service, 279 completed the alternative community service, and 78 were not drafted into any service.[6]

The sample means (using NEPS sampling weights) for men examined as "fit for service" and having completed military service (left column), no service (middle column) and alternative community service (right column) are displayed in Table 2. For the wage, sample size is reduced by between 21 and 31% of the observations due to non-response. For participation in volunteer work, sample size is reduced by between 33 and 49% due to panel attrition, as this information was asked 4 years after the collection of our main sample, in 2013/14.[7] It turns out that men who have completed either military or alternative mandatory service are somewhat more likely to remain in the sample, even when including our control variables in a regression analysis. However, the point estimates of the effects of mandatory military and alternative community service on panel attrition of −7 and −11 percentage points, respectively, are not statistically significant (results shown in the Supporting Information).

Table 2 compares raw means in our sample, without controlling for differences in age, education, degree of fitness or work experience. It shows that men who completed military or alternative community service (the two treatment groups) exhibit *higher* wages than those who did not serve (statistically significant only for the alternative community service). They are also more likely to be married and much more likely to engage in volunteer work. The latter is true for all areas of volunteer work (except "other, unknown") and statistically significant for the areas "culture, music, social and health" and "education and youth" (these are also areas in which a lot of alternative community services took place). On the other hand, men who completed a service are also older, more educated, and have

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[5]We exclude men with a T7 degree, not only because this category was not introduced until the mid-1990s but because as of 2001, T7 males were no longer drafted. The sample size is too small to use this reform in a regression discontinuity design strategy.

[6]According to anecdotal evidence, a request to complete the alternative community service instead of the military service may have been more successful before the medical exams and may have also have influenced the medical exam results. Men having completed alternative community service might therefore be a specially selected group which is why we have excluded them in a previous version of this study. Due to suggestion of a referee, we will present estimation results for this group as well with this caveat in mind.

[7]We thank an anonymous referee for suggestion to include volunteer work as an outcome variable.

TABLE 2 Weighted sample means for men examined to be "fit for service"

	Military service		Not treated		Alterative community service	
	Obs.	Mean	Obs.	Mean	Obs.	Mean
Outcome variables						
Hourly wage	236	16.31	54	15.18	217	17.28**
Log hourly wage	236	2.70	54	2.64	217	2.77*
Employed	297	0.91	78	0.86	279	0.88
Volunteer work (y/n)	174	0.50***	40	0.28	186	0.49***
Volunteer work in area						
Sports	174	0.18	40	0.11	186	0.15
Politics, religion and society	174	0.12	40	0.06	186	0.09
Culture, music, social and health	174	0.26***	40	0.09	186	0.23**
Education and youth	174	0.04**	40	0.00	186	0.04***
Other, unknown	174	0.02	40	0.03	186	0.05
Ever married	297	0.63	78	0.54	279	0.62
Currently married	297	0.61*	78	0.48	279	0.54
Partnership	297	0.88	78	0.85	279	0.86
Satisfaction with						
Life in general	297	0.78	78	0.76/0.73	279	0.75
Work	290	0.75	71	0.69/0.69	262	0.72
Finances	297	0.74	78	0.72/0.73	279	0.74
Health	297	0.79	78	0.81/0.79	279	0.80
Family	297	0.79	77	0.76/0.81	277	0.84
Friends	297	0.82	78	0.82/0.77	279	0.78
Treated	297	1.00***	78	0.00	279	1.00***
Control variables						
Age	297	33.30***	78	30.69	279	32.08***
Lower track	290	0.25	78	0.22	279	0.08**
Medium track	297	0.33**	78	0.48	279	0.28***
Higher track	290	0.13	78	0.08	279	0.09
Highest track	297	0.29	78	0.22	279	0.55***
Fitness T1	297	0.13	78	0.12	279	0.13
Fitness T2	297	0.73**	78	0.54	279	0.70**
Fitness T3	297	0.14***	78	0.33	279	0.17**
Work experience	297	10.82***	78	8.33	279	8.84

Note: The indicators of satisfaction with various aspects of life are normalized to lie between zero and one. Treatment equals one if a man has served in the military (or alternative community service) and zero otherwise. The lowest track corresponds to *Hauptschule* (usually 9 years of schooling), the medium track corresponds to *Realschule* (10 years of schooling). The higher track corresponds to *Fachhochschulreife* which is allows restricted access to tertiary education (for example restricted by subject) and is offered to students who have first completed the medium track. The highest track corresponds to *Gymnasium* (13 years of schooling). Satisfaction with different aspects of live is normalized by sample to be between 0 and 1 so that the normalization differs when considering alternative community service, for which the means for the group not treated is given after the slash. Asterisks indicate statistical significance for the difference in means test with respect to the "not treated" group (middle column).
***p < 0.01, **p < 0.05, *p < 0.1.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; information on volunteer work doi:10.5157/NEPS:SC6:12.0.1 and related panel attrition: doi:10.5157/NEPS:SC6:7.0.0; author calculations.

TABLE 3 Mandatory military service and log wages

Dependent variable: Log hourly wage	(1)	(2)	(3)	(4)	(5)
Mandatory military service	0.055 (0.072)	−0.045 (0.063)	−0.064 (0.059)	−0.084 (0.063)	−0.083 (0.062)
Age (years)		0.029*** (0.006)	0.036*** (0.006)	0.036*** (0.006)	0.003 (0.010)
Age squared		−0.003 (0.002)	−0.003 (0.002)	−0.003 (0.002)	−0.003 (0.002)
Lower school track			−0.242*** (0.079)	−0.238*** (0.080)	−0.257*** (0.074)
Higher school track			0.274*** (0.069)	0.271*** (0.068)	0.310*** (0.072)
Highest school track			0.179*** (0.062)	0.177*** (0.063)	0.264*** (0.066)
Degree of fitness T1				−0.003 (0.086)	−0.018 (0.081)
Degree of fitness T3				−0.072 (0.087)	−0.060 (0.085)
Work experience (years)					0.035*** (0.008)
Constant	2.641*** (0.064)	2.788*** (0.057)	2.775*** (0.062)	2.805*** (0.066)	2.381*** (0.128)
Observations	290	290	290	290	290
R-squared	0.003	0.094	0.248	0.252	0.298

Note: Least squares estimates; the lowest track corresponds to completion of *Hauptschule* (usually 9 years of schooling), the base category of the medium track corresponds to *Realschule* (10 years of schooling). The higher track corresponds to *Fachhochschulreife* which is allows restricted access to tertiary education (for example restricted by subject) and is offered to students who have first completed the medium track. The highest track corresponds to *Gymnasium* (13 years of schooling). T2 is the base category for the degree of fitness as assessed by the military's medical examination. Robust standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; author calculations.

more work experience than those who did not serve. At least part of these differences can be explained by a lower probability to be drafted for younger cohorts (see Figure 1). It is therefore unclear whether higher wages, higher employment, higher volunteer work and higher marriage/partnership rates of men who completed a service are the result of their service or their different socioeconomic background. The following section addresses these questions using regression analysis.

4 | RESULTS

We use ordinary least squares regression (OLS) to compare the log hourly wages, employment rates, indicators of doing volunteer work, ever having been or currently being married or living in a partnership, and indicators of satisfaction with various aspects of life of men who were drafted into the military versus those who were not. Our estimating equation is

$$(outcome)_i = \alpha + \tau(treatment)_i + \beta(degree_{fitness})_i + \gamma(controls)_i + \varepsilon_i,$$

where *outcome* is the logarithm of the hourly wage or any of the other outcomes like employment, doing volunteer work or satisfaction with various aspects of life, *treatment* is participation in mandatory military or alternative community service, the *degree of fitness* test result is a key control specified by dummy variables for T1 and T3 (with T2 as the base category), other *controls* are the educational schooling track, age, and work experience.

4.1 | Results for all birth cohorts 1970–1984

Table 3 reports the regression results for mandatory military service as treatment and the log hourly wage as the outcome variable, with control variables successively increased across the columns. That is, no control is included in column (1), but columns (2) and (3) add in age and education, respectively. In column (4), the degree of fitness is held constant (to exploit the natural experiment), while column (5) introduces a linear control for whether military service' potential effects can be explained through its effects on work experience. In this latter, because the age variable ranges only from 26 to 40 and is already controlled for in a second-order polynomial, we include no square of years of work experience.

Once control variables are added, the resulting point estimates suggest that military service *reduces* hourly wages by about 8.4% (column 4) and that this effect is not explained by differences in work experience between these two groups (comparing columns (4) and (5) in Table 4). However, the fact that the standard error for this 8.4% estimate is 6.3% indicates not only that the point estimate is not statistically significant but that a larger sample is needed to obtain a more precise estimate. Nevertheless, the other coefficients in the regression yield plausible values: a higher level of schooling is associated with higher wages, and the return to work experience for young workers (26 to 40) is 3.5% when age is held constant (column (5)).[8]

The estimation results for employment, marriage/partnership and volunteer work as outcome variables and military service as treatment are presented in Table 4. None of the estimated military service' effects is statistically significant, but the positive estimate for volunteer work comes close at 14.9 percentage points with a standard error of 9.6 percentage points. The point estimate for being currently married is also sizable at 9.7 percentage points, but with a standard error of 7.3 percentage points statistically insignificant. The other estimated effects of mandatory military service, including the one for employment, are very close to zero and not statistically significant.

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[8]Note that returns to experience are highest at the beginning of a person's career (Heckman et al., 2006, p. 321ff.), which explains this comparatively large estimate, given that we only observe young workers.

TABLE 4 Mandatory military service, employment, marriage and volunteer work

Dependent variable as stated above column	(1) Employment	(2) Ever married	(3) Currently married	(4) Currently lives in a partnership	(5) Does volunteer work
Mandatory military service	0.002 (0.048)	0.003 (0.077)	0.097 (0.073)	−0.001 (0.048)	0.149 (0.096)
Age (years)	−0.020*** (0.007)	0.014 (0.011)	0.011 (0.010)	−0.006 (0.008)	−0.015 (0.013)
Age squared	−0.001 (0.001)	−0.000 (0.002)	−0.002 (0.002)	−0.004*** (0.001)	−0.002 (0.002)
Lower school track	−0.090* (0.052)	−0.046 (0.081)	−0.181** (0.079)	−0.064 (0.052)	−0.109 (0.097)
Higher school track	0.044 (0.050)	0.009 (0.090)	−0.111 (0.086)	−0.070 (0.069)	0.184 (0.116)
Highest school track	0.097** (0.046)	0.024 (0.074)	−0.087 (0.072)	0.039 (0.050)	0.089 (0.090)
Degree of fitness T1	−0.064 (0.056)	0.112 (0.081)	0.052 (0.077)	0.041 (0.049)	0.090 (0.134)
Degree of fitness T3	0.002 (0.047)	0.056 (0.076)	0.155** (0.073)	0.039 (0.049)	0.112 (0.087)
Work experience (years)	0.035*** (0.007)	0.024*** (0.009)	0.016** (0.008)	0.019*** (0.007)	0.040*** (0.010)
Constant	0.534*** (0.099)	0.359*** (0.132)	0.438*** (0.130)	0.743*** (0.108)	−0.114 (0.148)
Observations	375	375	375	375	214
R-squared	0.184	0.136	0.118	0.106	0.150

Note: Linear probability models; robust standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; information on volunteer work doi:10.5157/NEPS:SC6:1.0.0; information on volunteer work doi:10.5157/NEPS:SC6:12.0.1 and related panel attrition: doi:10.5157/NEPS:SC6:7.0.0; author calculations.

TABLE 5 Mandatory military service and volunteer work in specific areas

Dependent variable: Volunteer work in area as stated above column	(1) Sports	(2) Politics, religion and society	(3) Culture, music, social and health	(4) Education and youth	(5) Other, unknown
Mandatory military service	0.051 (0.067)	0.047 (0.056)	0.114 (0.071)	0.035* (0.021)	−0.018 (0.038)
Age (years)	−0.011 (0.011)	0.019** (0.008)	0.006 (0.010)	−0.009 (0.007)	−0.009* (0.005)
Age squared	0.001 (0.002)	0.001 (0.001)	−0.003 (0.002)	−0.001* (0.001)	0.000 (0.000)
Lower school track	0.037 (0.082)	−0.092** (0.045)	−0.079 (0.083)	−0.058* (0.032)	−0.013 (0.020)
Higher school track	0.040 (0.082)	0.051 (0.080)	0.019 (0.095)	−0.051 (0.034)	0.114 (0.082)
Highest school track	0.038 (0.067)	0.063 (0.062)	−0.066 (0.079)	0.010 (0.042)	0.006 (0.022)
Degree of fitness T1	0.239** (0.121)	−0.044 (0.067)	−0.042 (0.098)	−0.039** (0.020)	−0.041* (0.024)
Degree of fitness T3	0.055 (0.085)	0.039 (0.056)	0.092 (0.084)	−0.040** (0.017)	−0.028 (0.021)
Work experience (years)	0.022*** (0.008)	−0.009 (0.007)	0.019** (0.009)	0.008 (0.006)	0.006 (0.004)
Constant	−0.199* (0.110)	0.157* (0.093)	0.004 (0.133)	−0.030 (0.067)	−0.037 (0.040)
Observations	214	214	214	214	214
R-squared	0.102	0.080	0.135	0.079	0.094

Note: Linear probability models; robust standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

TABLE 6 Mandatory military service and satisfaction with various aspects of life

Dependent variable: Satisfaction with—As stated above column	(1) Life	(2) Work	(3) Finances	(4) Health	(5) Family	(6) Friends
Mandatory military service	0.023 (0.019)	0.055 (0.037)	0.016 (0.030)	−0.016 (0.028)	0.051 (0.037)	0.020 (0.022)
Age (years)	−0.007** (0.003)	−0.002 (0.004)	−0.007** (0.004)	−0.006 (0.004)	−0.007 (0.005)	−0.004 (0.003)
Age squared	−0.000 (0.000)	−0.001 (0.001)	−0.001 (0.001)	−0.000 (0.001)	−0.000 (0.001)	0.000 (0.000)
Lower school track	−0.104*** (0.024)	−0.079** (0.039)	−0.144*** (0.033)	−0.073** (0.037)	−0.073* (0.040)	−0.038 (0.023)
Higher school track	−0.008 (0.025)	−0.021 (0.039)	−0.027 (0.027)	−0.002 (0.036)	−0.093** (0.045)	−0.062* (0.032)
Highest school track	−0.023 (0.019)	−0.066** (0.028)	−0.007 (0.021)	0.007 (0.027)	−0.023 (0.031)	−0.073*** (0.019)
Degree of fitness T1	−0.011 (0.022)	−0.041 (0.033)	0.027 (0.024)	−0.031 (0.034)	−0.037 (0.044)	−0.026 (0.025)
Degree of fitness T3	0.028 (0.023)	−0.017 (0.034)	0.023 (0.032)	−0.013 (0.036)	0.051 (0.035)	−0.003 (0.024)
Work experience (years)	0.010*** (0.003)	0.003 (0.004)	0.012*** (0.003)	0.005 (0.003)	0.009** (0.004)	0.002 (0.002)
Constant	0.678*** (0.037)	0.722*** (0.068)	0.638*** (0.051)	0.771*** (0.048)	0.684*** (0.062)	0.817*** (0.040)
Observations	375	361	375	375	374	375
R-squared	0.150	0.063	0.161	0.040	0.059	0.057

Note: Least squares estimates; robust standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1. The scale of the satisfaction indicators is 0–10 in the original data and has been normalized to [0,1] for these estimates.

Life = Satisfaction with life in general.

Work = Satisfaction with work.

Finances = Satisfaction with money, income, and possessions.

Health = Satisfaction with health.

Friends = Satisfaction with circle of friends/acquaintances.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; author calculations.

Table 5 explores the potential effect of mandatory military service on volunteer work further by showing estimates on different kinds of volunteer work. It turns out that the estimate for volunteer work in the area "education and youth" is statistically significant at the 10% level with a point estimate of 3.5 percentage points. The estimate for the area "culture, music, social and health" is much larger at 11.4 percentage points, but not quite statistically significant due to a standard error of 7.1 percentage points. The point estimates for the areas "sports" and "politics, religion and society" are also positive at 5.1 and 4.7 percentage points, respectively, but far from statistically significant.

Because the NEPS data include indicators of satisfaction with various aspects of life, we provide estimates using these aspects as outcome variables (Table 6). After normalizing the indicators' original Likert scaling to a range between 0 and 1, we are able to assess satisfaction with (1) life in general, (2) work, (3) financial situation, (4) health, (5) family, and (6) friends. As suggested by the sample means in Table 2, in all cases, the satisfaction indicators are on average 70% or higher. The point estimates of mandatory military service' effects on any of the satisfaction indicators are 5.5 percentage points at the maximum—5.5 percentage points for satisfaction with work and 5.1 percentage points for satisfaction with family life—but no estimate is statistically different from zero.

Are the results similar when we estimate the effects of alternative community service, which could be chosen as an alternative to mandatory military service? Tables 7 to 9 exhibit no statistically significant results for most outcome variables. The exception is volunteer work, for which the coefficient for alternative community service is statistically significant at the 5% level and at 24.7 percentage points (standard error 10.7 percentage points) larger than the one of mandatory military service (which is 14.9 percentage points, Table 4). When considering the areas of volunteer work, the coefficient for alternative community service is significant at the 5 percent level for "culture, music, social and health" at 21.7 percentage points with a standard error of 8.7 percentage points. The point estimates for the other areas (except "other, unknown") are also positive, but not statistically significant. Again, similar to the results for mandatory military service, the estimates of the effects of alternative community service on various aspects of satisfaction with life are not statistically significant and the point estimates are close to zero (Table 9).

4.2 | Results for birth cohorts 1976–1984

As yet, we have detected no statistically significant effects of mandatory military or alternative community service on any of the outcome variables investigated except for doing volunteer work. Hence, in a further series of regressions, we produce separate estimates for the birth cohort group 1976–1984 to take into account the 1995 reform of the military's medical exam combined with the decreasing demand for soldiers, which significantly raised the share of potential conscripts not being drafted in the post-1976 birth cohorts. Hence, the cohorts born after 1976 might more credibly have been subject to a natural experiment.

Because splitting our sample by birth cohort group reduces sample size even further, we expect it to be more difficult to find statistically significant effects due to reduced power of the corresponding t-tests. Table 10 reports the results for log wage as the outcome variable. Despite of the reduced sample size, for the 1976–1984 birth cohorts, the point estimates suggest a reduction in hourly wage of 15.1 and 15.6% in the specifications where work experience is held constant versus not taken into account, respectively. Thus, taking work experience into account, the reduction in wages from participating in mandatory military service is slightly diminished. The standard errors attached to these estimates are 7.6 and 7.8%, respectively, which makes both estimates statistically significant at the 5% level. The point estimates of negative hourly wage effects over 15%, with standard errors of over 7%, produce confidence intervals that mirror the smaller (albeit still significant) negative wage effect estimated by Angrist (1990) and Angrist et al. (2011) for the U.S., by Imbens and van der Klaauw (1995) and Hubers and Webbink (2015) for the Netherlands, and by Bingley et al. (2020) for Denmark. These authors' point estimates are 3–5% for 8 months of service in Denmark or for 14 months of service in the Netherlands, and 15% for 37 months with the U.S. armed forces in Vietnam.

TABLE 7 Alternative community service and various outcomes

Dependent variable as stated above column	(1) Log hourly wage	(2) Employed	(3) Ever married	(4) Satisfied with life	(5) Volunteer work
Alternative community service	0.008 (0.062)	0.016 (0.042)	0.028 (0.074)	0.019 (0.020)	0.247** (0.107)
Age (years)	0.027*** (0.009)	−0.013*** (0.006)	0.006 (0.010)	−0.007*** (0.003)	−0.008 (0.012)
Age squared	−0.003* (0.002)	−0.002* (0.001)	−0.002 (0.002)	−0.000 (0.001)	0.002 (0.002)
Lower school track	−0.115 (0.072)	−0.198*** (0.067)	−0.001 (0.107)	−0.116*** (0.036)	−0.005 (0.142)
Higher school track	0.193** (0.077)	0.069 (0.051)	0.143 (0.098)	−0.009 (0.027)	0.032 (0.123)
Highest school track	0.119* (0.062)	−0.040 (0.045)	0.084 (0.071)	−0.013 (0.020)	−0.094 (0.096)
Degree of fitness T1	−0.021 (0.067)	0.074 (0.046)	0.200** (0.082)	0.012 (0.019)	0.163 (0.112)
Degree of fitness T3	−0.030 (0.062)	0.080* (0.046)	0.032 (0.071)	0.002 (0.026)	0.015 (0.096)
Work experience (years)	0.011 (0.008)	0.033*** (0.006)	0.029*** (0.007)	0.010*** (0.002)	0.009 (0.010)
Constant	2.672*** (0.125)	0.619*** (0.095)	0.294** (0.127)	0.659*** (0.033)	0.132 (0.159)
Observations	271	357	357	357	226
R-squared	0.228	0.228	0.156	0.113	0.067

Note: Least squares estimates; robust standard errors in parentheses;

***p < 0.01, **p < 0.05, *p < 0.1.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; information on volunteer work doi:10.5157/NEPS:SC6:1.0.0; and related panel attrition: doi:10.5157/NEPS: SC6:7.0.0; author calculations.

TABLE 8 Alternative community service and volunteer work in specific areas

Dependent variable: Volunteer work in area as stated above column	(1) Sports	(2) Politics, religion and society	(3) Culture, music, social and health	(4) Education and youth	(5) Other, unknown
Alternative community service	0.035 (0.072)	0.040 (0.062)	0.217** (0.087)	0.031 (0.020)	−0.015 (0.040)
Age (years)	−0.007 (0.008)	−0.000 (0.008)	−0.006 (0.011)	0.005 (0.004)	0.003 (0.004)
Age squared	0.002 (0.001)	0.000 (0.001)	−0.001 (0.002)	−0.000 (0.001)	0.000 (0.001)
Lower school track	−0.019 (0.089)	−0.088* (0.045)	0.138 (0.135)	−0.023 (0.026)	−0.028 (0.018)
Higher school track	−0.015 (0.081)	0.042 (0.074)	−0.026 (0.099)	0.072 (0.064)	0.119 (0.084)
Highest school track	−0.022 (0.075)	−0.014 (0.061)	−0.097 (0.076)	−0.014 (0.038)	0.041 (0.031)
Degree of fitness T1	0.136 (0.100)	−0.008 (0.063)	0.142 (0.105)	0.007 (0.029)	−0.063*** (0.022)
Degree of fitness T3	−0.072 (0.060)	0.054 (0.057)	0.065 (0.081)	−0.001 (0.034)	−0.029 (0.031)
Work experience (years)	0.001 (0.007)	0.001 (0.007)	0.005 (0.007)	−0.003 (0.003)	0.001 (0.003)
Constant	0.066 (0.089)	0.036 (0.091)	−0.003 (0.134)	0.043 (0.069)	0.034 (0.037)
Observations	226	226	226	226	226
R-squared	0.046	0.023	0.070	0.042	0.044

Note: Linear probability models; robust standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; information on volunteer work doi:10.5157/NEPS:SC6:12.0.1 and related panel attrition: doi:10.5157/NEPS: SC6:7.0.0; author calculations.

TABLE 9 Alternative community service and satisfaction with various aspects of life

Dependent variable: Satisfaction with—As stated above column	(1) Life	(2) Work	(3) Finances	(4) Health	(5) Family	(6) Friends
Alternative community service	0.001 (0.020)	0.031 (0.032)	−0.001 (0.025)	0.030 (0.024)	0.028 (0.029)	0.018 (0.029)
Age (years)	0.003 (0.003)	0.001 (0.004)	−0.003 (0.003)	−0.010** (0.004)	−0.003 (0.003)	−0.000 (0.004)
Age squared	0.000 (0.001)	0.000 (0.001)	−0.000 (0.001)	−0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
Lower school track	−0.018 (0.012)	−0.072 (0.057)	−0.166*** (0.046)	−0.101** (0.046)	−0.073 (0.052)	−0.027 (0.043)
Higher school track	0.085 (0.061)	0.008 (0.039)	−0.038 (0.027)	−0.017 (0.030)	−0.046 (0.040)	−0.073* (0.039)
Highest school track	0.023 (0.019)	−0.049* (0.027)	−0.007 (0.021)	−0.063*** (0.023)	−0.019 (0.026)	−0.057** (0.025)
Degree of fitness T1	−0.039*** (0.013)	−0.028 (0.030)	0.003 (0.022)	−0.027 (0.029)	0.035 (0.026)	−0.009 (0.026)
Degree of fitness T3	−0.016 (0.017)	−0.020 (0.033)	−0.029 (0.026)	−0.033 (0.030)	−0.009 (0.029)	−0.024 (0.034)
Work experience (years)	−0.000 (0.002)	0.005 (0.004)	0.008*** (0.003)	0.003 (0.003)	0.006** (0.003)	0.001 (0.003)
Constant	0.018 (0.022)	0.680*** (0.064)	0.698*** (0.047)	0.801*** (0.040)	0.758*** (0.047)	0.787*** (0.053)
Observations	357	333	357	357	354	357
R-squared	0.033	0.052	0.136	0.093	0.046	0.030

Note: Least squares estimates, robust standard errors in parentheses.

***p < 0.01. **p < 0.05. *p < 0.1. The scale of the satisfaction indicators is 0–10 in the original data and has been normalized to [0,1] for these estimates.

Life = Satisfaction with life in general.

Work = Satisfaction with work.

Finances = Satisfaction with money, income, and possessions.

Health = Satisfaction with health.

Family = Satisfaction with family life.

Friends = Satisfaction with circle of friends/acquaintances.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; author calculations.

TABLE 10 Mandatory military service and log hourly wages before and after the 1995 reform

Dependent variable: Log hourly wage	(1) Birth cohorts 1970–1975[1]	(2) Birth cohorts 1970–1975[1]	(3) Birth cohorts 1976–1984	(4) Birth cohorts 1976–1984	(5) Birth cohorts 1976–1984—Treated serving no longer than 20 months in the military	(6) Birth cohorts 1976–1984—Treated serving no longer than 20 months in the military
Mandatory military service	0.086 (0.088)	0.107 (0.089)	−0.156** (0.078)	−0.151** (0.076)	−0.134* (0.079)	−0.138* (0.078)
Age (years)	0.131 (0.099)	0.119 (0.098)	0.022 (0.046)	−0.030 (0.043)	−0.000 (0.045)	−0.045 (0.043)
Age squared	−0.015 (0.012)	−0.017 (0.012)	−0.005 (0.006)	−0.007 (0.006)	−0.008 (0.007)	−0.009 (0.006)
Lower school track	−0.207* (0.112)	−0.207* (0.108)	−0.272** (0.113)	−0.307*** (0.101)	−0.117 (0.115)	−0.171 (0.105)
Higher school track	0.247* (0.126)	0.289** (0.131)	0.283*** (0.078)	0.320*** (0.083)	0.291*** (0.079)	0.333*** (0.084)
Highest school track	0.084 (0.096)	0.202* (0.113)	0.256*** (0.083)	0.315*** (0.082)	0.247*** (0.087)	0.310*** (0.084)
Degree of fitness T1	0.089 (0.131)	0.066 (0.131)	−0.077 (0.104)	−0.080 (0.096)	−0.122 (0.119)	−0.130 (0.109)
Degree of fitness T3	0.019 (0.122)	0.020 (0.119)	−0.128 (0.123)	−0.097 (0.122)	−0.195 (0.123)	−0.179 (0.118)
Work experience (years)		0.028* (0.015)		0.039*** (0.009)		0.040*** (0.010)
Constant	2.492*** (0.194)	2.092*** (0.300)	2.853*** (0.100)	2.370*** (0.157)	2.832*** (0.099)	2.348*** (0.156)
Observations	142	142	148	148	130	130
R-squared	0.143	0.168	0.309	0.374	0.264	0.343

Note: Least squares regression, robust standard errors in parentheses;

***p < 0.01, **p < 0.05, *p < 0.1. [1]Because the first birth cohort in 1975 was only slightly affected by the 1995 reform of military and community service, it is combined with the cohorts still affected by the old system.

Source: NEPS Starting Cohort 6 – Adults, doi:10.5157/NEPS:SC6:1.0.0; author calculations.

Because men committing to a longer period of service might have been more likely to be drafted in Germany and may be a selected group, we also reduce the sample to men who did not serve longer than 20 months in the military. The sample size in this case reduces from 148 to 130 in the last two columns of Table 10. The point estimates are still negative at over 13% and statistically significant at the 10% level with standard errors of 8%.[9] In sum, then, our results suggest that mandatory military service may have a negative effect on hourly wages, even when the loss of work experience incurred by military service is controlled for. A more precise claim, however, would require a larger sample size.

In results shown in the Supporting Information, we find for the 1976–1984 birth cohorts, despite decreased sample size, that mandatory military service increases participation in volunteer work in the areas "politics, religion and society" and "education and youth" (the latter only when not controlling for work experience). We even find positive effects for satisfaction with work and friends. Similarly, for the same cohorts, we find that alternative community service increases volunteer work in the area "politics, religion and society" and satisfaction with work and health. However, although the point estimate for the wage effect of alternative community service is also negative at 8.5%, it is not statistically significant, as the standard error is 8.2%.

The picture which emerges from our estimates based on the National Educational Panel Study (NEPS), with its rich set of variables but low sample size, is that mandatory military (or alternative community) service may have a wage cost due to an early break in a person's educational career. It seems, however, that this break might have an impact by making affected people (here only men) more publicly and socially involved in that they are more likely to engage in volunteer work.[10]

5 | CONCLUSIONS

Using unique data on the German military's medical exam, this study examines the effect of mandatory military and alternative community service on the hourly wage, employment, volunteer work in different areas, marital and partnership status, and satisfaction with different aspects of live of the 1970–1984 German birth cohorts. By exploiting the natural experiment that in the post-cold war period (and especially for post-1976 birth cohorts) not all potential conscripts were drafted (interpreted as almost random), and controlling for medical exam results, secondary school track, and work experience, we do not find many significant effects.

However, it is remarkable that especially alternative community service (in German: *Zivildienst*) seems to significantly increase volunteer work (in German: *Ehrenamt*). Estimates are positive for all areas investigated and statistically significant for "culture, music, social and health". For mandatory military service, we also find positive point estimates on participation in volunteer work, but only the estimate for the area "education and youth" is statistically significant. Given alternative community service was a few months longer and men often announced their preference for this service before the military's medical exam (which they still needed to pass), there may be some endogeneity in the choice of alternative community service which our methodology cannot control for. However, given that alternative community service was often done in hospitals, care homes for the elderly or institutions supporting youth, it is plausible that some men stuck with similar volunteer work after their mandatory service (Grünhaus et al., 2021). For the birth cohorts born 1976 and after we also find an improvement in satisfaction with work (both military and community service), friends (military service) and health (community service).

On the downside, we find that birth cohorts born 1976 and after show statistically significant negative wage effects of mandatory military service. The point estimates suggest a wage reduction of about 15 to 16%, although the standard error is almost 8%, which produces a confidence interval including the statistically significant point estimates

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[9]This robustness check was suggested by an anonymous referee.

[10]Based on the suggestion of a referee, we also produced separate estimates for men who had apprenticeship or less as the highest professional qualification (if mandatory service impacts educational aspirations, this might be a selected group). In results shown in the Supporting Information, most estimates are still insignificant, possibly also because of lower sample size, but the estimates for volunteer work still turn out statistically significant with larger point estimates (and larger standard errors) than for the complete sample. Point estimates for wage effects are negative for mandatory military and positive for alternative community service, but not statistically significant.

for the U.S. (Angrist, 1990; Angrist et al., 2011), Netherlands (Imbens & van der Klaauw, 1995), and Denmark (Bingley et al., 2020). For alternative community service, the point estimate is also negative, but not statistically significant.

Although our small sample size may have prevented the identification of significant effects in several cases, our findings do imply that in a developed economy with a competitive labor market, a career break through mandatory military service may have a negative wage effect for the *average* conscript, even when actual work experience is controlled for. This observation does not, however, mean that low-skilled men cannot benefit from military service, as did some Portuguese men with at most 4 years of schooling (Card & Cardoso, 2012).

To sum up, mandatory military or alternative community service, apart from being a form of forced labor, may have some negative wage effects. However, these services also seem to have changed the perspective of participants by raising their willingness to engage in volunteer work and possibly raising their satisfaction with some aspects of their lives. Although more robust evidence is needed, a tentative policy implication might be that school programs exposing high school students to institutions such as hospitals, care homes, institutions supporting youth, or institutions supporting national defense such as the military or disaster control, may help widening the societal perspective of young people and increasing volunteer work without forcing young people to interrupt their educational careers for a full year. As other authors (cited above) have found for military service and as Light and Ureta (1995) have demonstrated for career breaks due to child birth, extended interruptions may have negative effects in the labor market.

DATA AVAILABILITY STATEMENT

The data used in this study are subject to third party restrictions. Interested researchers can apply for access to the data and will have to sign a data use agreement with the Leibniz Institute for Educational Trajectories (LIfBi). For more information, please see: https://www.neps-data.de/Data-Center/Data-Access/Data-Use-Agreements. Replication files are available and have been submitted to Kyklos.

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