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Serving and dying:
A study of factors associated with combat exposure and mortality among French WW1 soldiers

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Abstract:

Based on individual-level data from military registers, this paper explores the trajectories of French conscripts during the Great War. The sample studied consists of more than 20,000 men of the recruitment classes of 1900 to 1914. Besides a descriptive analysis, which aims at providing both a statistical portrait of conscripts and an insight into their wartime paths, regression analyses are carried out to identify factors influencing, or associated with, (1) fitness for armed service, (2) assignment to a civilian rather than military position, (3) infantry assignment, and (4) war mortality. The main focus is on whether there were inequalities in combat exposure and mortality in relation to socioeconomic status (as measured by family background, education, and occupation). The results of these analyses suggest that some social groups were more exposed to war violence than others. In particular, it appears that conscripts employed as farmers in civilian life were more likely to be considered fit to fight than industry/craft workers and (most of) men working in the tertiary sector. They were also more likely to join the war as infantry soldiers and had a lower probability to be recalled from the front and assigned to a civilian position. All this partly explains why mortality was higher in this group. Similarly, the analysis of deaths reveals that conscripts from disadvantaged family backgrounds (i.e. who were born out of wedlock and/or placed in public care during childhood) had a higher risk of dying during the conflict. The differences in mortality risk according to family background and occupation were, however, of lower magnitude than those associated with military characteristics (recruitment class, assignment and rank).

Key words: World War 1; French Army; war mortality; social stratification; archival data.

JEL Classification: N34, N44, Z13.
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*"La première, la plus essentielle des égalités, c'est celle, devant l'impôt du sang,
de tous les hommes en âge et en état de porter les armes"*[1]

1. Introduction

During the Great War, in metropolitan France, 8 million men were mobilised in the Army. At least 1.4 million of them died in service. More than 3 million were wounded (Prost, 2008). Among the latter, about 1 million were officially recognised as war invalids (Huber, 1931). The conflict also resulted in a dramatic fall in fertility, with a birth deficit (in years 1914 to 1919) of similar magnitude as war fatalities (Festy, 1984), and had effects on nuptiality patterns (Henri, 1966).

In August 1914, Raymond Poincaré, President of the French Republic (1913-1920), had declared that France would be *"heroically defended by all its sons"*, and that *"nothing* [would] *break their sacred union in the face of the enemy"*[2]. At that time, a short war (of a few weeks or months) was expected. When it was clear that the conflict was going to turn into a long war of attrition, and after the terrible losses of the first months (more than 300,000 soldiers killed, reported missing or captured in August-September 1914) (Marin, 1920), the inequalities before the "*impôt du sang*" (blood tax) became an increasingly sensitive issue, both among combatants and within public opinion (Horne, 1989). The opprobrium fell primarily upon the "*embusqués de l'intérieur*" (home-front shirkers); namely, all those who were employed in offices, railway companies, factories, etc., sometimes without having the required skills (Boulanger, 1998; Ridel, 2007). But there were also the "*embusqués du front*" (shirkers at the front), these soldiers assigned to various non-combat duties, generally held in low esteem by combatants[3]. Furthermore, as is well-known, exposure to danger varied considerably between combat branches. Infantrymen were obviously among those who were at greatest risk of being killed or wounded on the battlefield. Although the type of wartime service could depend on multiple factors, it is likely that soldiers from some social groups had greater chances than others of avoiding an infantry assignment and/or greater chances of being assigned to non-combat roles (in the rear or at the front) (Loez, 2012).

This paper is interested in exploring the trajectories of French conscripts during the Great War. The approach is quantitative. It relies on individual-level data coming from military registers. The sample consists of more than 20,000 conscripts. In the first, descriptive part of the study, these data were used to develop a statistical portrait of conscripts, to examine their war experience, and to provide a preliminary analysis of deaths. Then, regression analyses were carried out to identify factors influencing, or associated with, (1) fitness for armed service, (2) assignment to a civilian rather than military position, (3) infantry assignment, and (4) war mortality. The main focus was on whether there were inequalities in combat exposure and mortality in relation to socioeconomic status.

The paper is structured as follows. Section 2 provides a brief overview of the related literature. Section 3 presents the data. The descriptive analysis is presented in Section 4, while Section 5 is devoted to the regression analyses and their results. Finally, Section 6 discusses these results and provides some concluding remarks.

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[1] The quote comes from a newspaper article by Henry Mortimer-Mégret, published on 9 November 1916 in *L'Œuvre*, under the title "*L'égalité devant l'impôt du sang*".

[2] "Dans la guerre qui s'engage, la France (…) sera héroïquement défendue par tous ses fils, dont rien ne brisera devant l'ennemi l'union sacrée". Message to the Parliament (read by René Viviani, President of the Council), 4 August 1914.

[3] On this point, refer to Henri Barbusse's war novel *Le feu* (Barbusse, 1916). In Chapter IX (entitled "*La grande colère*"), the soldier Volpatte bitterly states: *"(…) chez nous, et même dans un régiment en ligne, y a des filons, des inégalités"* (*Le feu*, 1916, p. 134; absent from Wray's translation). He adds: "All those that never go up to the trenches, or those who never go into the first line, or even those who only go there now and then, they're shirkers, if you like to call 'em so (...)" (*Le feu*, 1916, translated by F. Wray, 1917, p. 128). See also Louis Barthas's war notebooks (Barthas, 1978/1997, p. 327).

2. Related literature

Soon after the Armistice of 1918, Louis Marin, deputy in the French National Assembly, presented a detailed report on WW1 casualties (Marin, 1920). This report, among other things, revealed that some social groups suffered proportionally more deaths than others. The heaviest toll was among farmers, as well as among liberal professionals. In addition to these differences across social groups, the report also mentioned the possible existence of geographical disparities in the proportion of deaths, although no figures were provided. The first statistics on the subject were published in 1924, in the periodical *L'Impartial français* (issue of 15 March 1924). They showed large differences in mortality across military regions (with fatality rates of around 20% for the regions of Le Mans, Orléans, Rennes, and Limoges, as against 11.9% for the region of Marseille, and 10.5% for the military Government of Paris). However, according to Huber (1931), these statistics should be taken with some caution. In the chapter of his book devoted to the French Army's losses, the author, for his part, stressed the fact that mortality was particularly high among young intellectuals. It was notably found that 41% of the students or recent graduates of the *Ecole Normale Supérieure* (classes of 1908 to 1917) had lost their lives during the war (Huber, 1931, p. 425), a figure also quoted by Sauvy (1965, p. 23).

These raw data, from old publications, only vaguely suggest the existence of socioeconomic and spatial differentials in war mortality. Much more recently, as part of the commemoration of the conflict's centenary, several data sources on French WW1 soldiers have been made available on the "*Mémoire des hommes*" website of the Ministry of the Armed Forces (http://www.memoiredeshommes.sga.defense.gouv.fr/). One of these is the "*Morts pour la France*" database, which contains the death records of more than 1.3 million soldiers. This database was used in a number of quantitative studies focusing on geographical disparities in fatality rates (Gilles et al., 2014; Beau, 2017; Guillot and Parent, 2018). By comparing war deaths with population figures from the 1911 Census, Gilles et al. (2014) found that the proportion of men who died in WW1 varied significantly across regions and *départements*. Their econometric results allowed them to conclude that these differences could mainly be explained by demographic factors. The analysis carried out by Beau (2017) was essentially descriptive. Like Gilles et al. (2014), the author found significant (but less marked) differences in mortality between *départements*. Both papers relied on aggregated data. A different approach was taken by Guillot and Parent (2018), who examined the survival times of more than 17,000 soldiers drawn from the "*Morts pour la France*" database. Their analysis, which aimed at identifying contextual effects, showed that the average survival time varied across *départements* and, at least for infantry soldiers, between regiments. None of these studies has explicitly explored the factors influencing the individual risk of dying in the war.

The only published papers that used micro-level regression models to examine mortality/survival during WW1 are those of Kanazawa (2007), McCalman et al. (2019), Fornasin et al. (2019) and Bailey et al. (2023). The study by Kanazawa (2007) was carried out on a sample of 1,000 British soldiers (ranks other than officers). It aimed at exploring the effect of soldiers' height on survival chances. Only a small number of control variables were included in the analysis (weight, chest girth, age, and marital status). The results indicated that taller soldiers were more likely to survive the war than those of shorter stature. Bailey et al. (2023) also looked at British soldiers. Based on a sample of 2,406 (non-officer) servicemen, they investigated the factors associated with enlistment date, infantry assignment, and mortality. The focus was on whether socioeconomic background played a significant role in soldiers' trajectories. According to the estimation results, soldiers from white-collar households did not enlist later than those with a father in a manual occupation, and were not less likely to serve in the infantry. It nonetheless appeared that these men had better chances to survive. The study carried out by McCalman et al. (2019) examined mortality among Australian soldiers. It relied on a sample of 6,183 men from the State of Victoria. This sample, unlike those studied by Kanazawa (2007) and Bailey et al. (2023), included not only ordinary soldiers, but also officers. The authors found no significant effect of social class background on mortality during WW1. However, the results also showed that higher-educated men were more likely to lose their lives. The last of these studies, by Fornasin et al. (2019),

provided an analysis of war deaths in the Italian Army. This analysis was based on a much larger sample than in the other studies. Indeed, the sample consisted of 62,353 soldiers from the Friuli province. It was found, among other results, that the risk of dying in WW1 was higher among soldiers who were unable to read and those employed as agricultural or construction workers in civilian life. As pointed out by the authors, an important limitation of their study was the lack of distinction between officers and ordinary soldiers.

The present paper contributes to this literature by offering a micro-level exploration of combat exposure and mortality during WW1 that focuses on the French case. The sample studied here, though smaller than the sample used by Fornasin et al. (2019), is of substantial size (more than 20,000 conscripts, which is far more than in the studies on British or Australian data), and it covers all ranks. Furthermore, as regards the methodology, the present study seems to be the first to employ discrete-time hazard rate models (with unobserved heterogeneity) to investigate the factors influencing the risk of dying in WW1.

3. Data

The data come from the military registers (*registres matricules militaires*) of conscripts enlisted in metropolitan France. These registers, kept in the archives of the *départements*, were digitised during the 2010 decade and gradually made available on the websites of the local archives services (*Archives départementales*)[4].

The present study relies on a representative sample of soldiers of the classes of 1900 to 1914 (i.e. born between 1880 and 1894). It thus focuses on men serving in the Active Army (i.e. those of the classes of 1911, 1912 and 1913, plus, from September 1914, the young recruits of 1914) or in the Reserve Army (classes of 1900 to 1910) at the beginning of the war. The conscripts of the classes of 1915 to 1919 were not of fighting age in 1914[5]. This explains why they were not included in the sample. The decision to also leave out soldiers of older classes was motivated by the fact that these men, belonging to the Territorial Army or to the Territorial Reserve in 1914, were less likely to have served on the front lines during the conflict[6].

Individuals were selected based on their day of birth. Following the strategy adopted by Guillot and Parent (2018) in their research work on the *Morts pour la France*, the original intention was to build a sample including all conscripts born in the first seven days of October. The individual military records (*fiches matricules*) of these men were thus collected on more than half of the local archives websites. However, given the magnitude of the task – a 1/52nd sample would have consisted of more than 80,000 servicemen –, it was finally decided to restrict the selection to individuals born in the first or fourth day of October[7]. The sample covers all the 87 French metropolitan *départements* of the time[8].

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[4] A pioneering work based on military registers was carried out more than forty years ago by Maurin (1982). It was a quantitative study focusing on conscripts from the local areas of Mende (*département* of Lozère) and Béziers (*département* of Hérault). The sample consisted of 9,132 men. This work provided a detailed description of the military trajectories of these men. However, no regression analysis was performed on the data.

[5] The class of 1915 was called up in December 1914. The young men of this class, like those of the classes of 1916 to 1919, did not fight in 1914.

[6] According to Marin's report, the proportion of deaths was three times lower in the classes prior to 1900 than in those of 1900 to 1914 (Marin, 1920, p. 82).

[7] Retaining only one day, namely October 1st (a solution briefly considered), would have produced a sample of too limited size (around 12,000 individuals). In addition to October 1st, a second day was therefore chosen at random among those initially selected (October 4th).

[8] To be more precise, in 1914, metropolitan France was composed of 86 *départements*, plus the *Territoire de Belfort* (i.e. the subsisting part of the *Haut-Rhin*, after the annexation of Alsace-Lorraine by Germany in 1871).

Once the digitised military records of the selected conscripts were gathered, the next step was to enter the data into a computerised file. The information extracted from these records can be divided into three sets of variables[9]:

– Personal characteristics (information mainly recorded at the time of registration on military census lists (*tableaux de recensement militaire*) or at the time of the draft board examination (*conseil de révision*), i.e. when the conscript was 20 years old): date and place of birth, place of residence, family background (in particular, whether the conscript's parents were alive or not), height, diseases and/or infirmities, education level, occupation, and court convictions;

– Variables relating to military duties (prior to the war): recruitment bureau, class, decision of the draft board regarding the conscript's fitness (i.e. fit for armed service, fit for auxiliary service, deferred, or exempted), subsequent decisions of military authorities based upon recommendations of medical boards (e.g. passage from armed to auxiliary service *or vice versa*, medical discharge), dates of these decisions, and whether the conscript was at one point or another, during his reserve time, assigned to a civilian position (railway companies, Post and Telegraph administration, Police, Customs, etc.);

– Variables relating to war experience: initial and subsequent assignments, dates of assignment changes, initial rank, promotions or demotions, dates of rank changes, a series of variables describing the soldier's war trajectory (spells of service on the Western Front or in other theatres of operations, stays in hospitals, periods of incarceration, etc.; occurrence and dates of various events: wounds, medical discharge, passage from military to civilian assignment, capture by the enemy, desertion, military convictions), number and dates of citations, decorations, whether the soldier died during the war, and if so, the date and circumstances of his death[10].

The whole sample consists of 23,489 individuals. It should be noted that 1,051 of them died before the war. These individuals were, of course, left out from the analysis. Also excluded were conscripts who had been recognised as foreigners (and, consequently, had been removed from the recruitment lists) or/and who did not serve in the French Army (*n* = 26), those for whom almost no information was available (*n* = 17)[11], and those who went to war as sailors (*n* = 500)[12]. This reduced the sample to 21,895 individuals. Finally, the choice was made to also exclude those born before 1900 (*n* = 121)[13], which led to a sample of 21,774 conscripts. The distribution by recruitment class is given in Table 1.

4. Descriptive analysis

4.1. Statistical portrait of conscripts

Place of birth and family background

Almost all conscripts in the sample (99%) were born in Metropolitan France, including 7.1% in the former *Seine département* (containing Paris). Among those who were not born in one of the 87 metropolitan *départements*, a number were from the annexed Alsace-Lorraine (*n* = 54) or from Algeria or other non-metropolitan territories (*n* = 34). Those born abroad (*n* = 114) were from a total of 23 different countries, but mainly from Belgium, Italy and Switzerland[14]. As regards family background, the

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[9] Given that military records were collected and classified by *département*, recruitment bureau, class, and day of birth, these latter variables were not directly drawn from the digitised documents but were generated beforehand.

[10] The date of death is also known for (almost all) individuals who died before 1914, as well as for those who, having survived the war, died before they were definitively released from their military duties.

[11] These are soldiers whose military record was missing. It was replaced by a document, called *feuillet nominatif de contrôle*. In most cases, such a document provides little more than the soldier's name, and his date and place of birth.

[12] The individual records of sailors usually contain less information than those of ground soldiers. In many cases, nothing is known about their war trajectory.

[13] Each class of conscripts comprised a number of men older than normal age. Most of them were foreigners who became French citizens by naturalisation and were registered on recruitment lists at that time.

[14] The place of birth of 5 conscripts is unknown.

data reveal that 3.2% of conscripts were born out of wedlock (recognised by their father or not, abandoned by their mother or not) or/and were placed in public care. It should also be noted that at the time of conscription, one-fourth had lost at least one of their parents (Table 1).

Height

Military records provide some information on conscripts' physical appearance: hair and eye colours, shape of the face and facial details (brow, nose, mouth), distinguishing marks (such as tattoos), and, of particular interest here, height[15]. The average (and median) height of conscripts was 165 cm (5'5")[16]. The majority of them (58.7%) were between 160 cm and 170 cm tall. The conscripts of the classes of 1910 to 1914 were somewhat taller than those of the classes of 1900 to 1904 (165.8 cm, on average, as against 165.3 cm). The average stature also varied across *départements*, with men born in the North and East of France tending to be taller than those born in the South[17].

Health/fitness status

Three quarters of conscripts (75.6%) were probably in very good health when they appeared before the draft board, since, following the medical examination, they were considered (physically and mentally) fit for armed service[18]. Among those who were found unfit, some were assigned to auxiliary service (4% of the whole sample) while others were exempted from military duty (5%) or deferred (*ajournés*) (15.4%). Nearly 70% of the conscripts who obtained a deferment (of one year or two) were declared unfit due to weak physical constitution (including insufficient height or weight). In the personal records of those who were exempted and of those who were classified as fit for auxiliary service, various types of diseases (or infirmities) were encountered. Among the former, besides physical weakness (18.3%), the most prevalent were musculoskeletal diseases or disorders (17%), respiratory diseases (12.1%), vision disorders and eye diseases (10.5%). Affections of the musculoskeletal system and visual affections were also among the most common health conditions for those assigned to auxiliary service (25.5% and 20.2%, respectively). Other frequent concerns, among these men, were heart diseases and varicose veins (12.6%), as well as traumatic lesions and imperfect cicatrization (10%)[19].

Non-negligible proportions of conscripts experienced changes in fitness status before the war. In particular, it should be noted that 7.3% of those who were declared fit for armed service by the draft board were subsequently discharged for medical reasons. The distribution of the sample according to military fitness in August 1914 was as follows: 75.5% of men were able to fight (the same proportion as at the time of draft board examination), 8.4% were unfit for armed service but fit for auxiliary service, and 16.1% were exempted, discharged or deferred (Table 1 and Figure 1).

Education

Education level at the time of conscription was measured on a six-point scale, ranging from 0 to 5 (Bulletin Officiel du Ministère de la Guerre, 1906)[20]. These six levels were the following: 0 – cannot read or write; 1 – can read; 2 – can read and write; 3 – can read, write and count; 4 – holds the *Brevet de l'enseignement primaire* (higher primary education)[21]; 5 – holds the *Baccalauréat* or a higher degree (*Licence*, etc.). In the sample studied, among the individuals for whom this information was

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[15] The individual's weight was not systematically recorded. Height is missing for 5.2% of the sample.

[16] The tallest was 196 cm and the shortest 141 cm.

[17] This observation is in line with that of Chamla (1964).

[18] This proportion includes the 7.5% of volunteers.

[19] The prevalence rates mentioned in this paragraph are certainly underestimated. Indeed, for 16.8% of unfit men, no information about diseases was recorded.

[20] When the conscript's education level was unknown, it was indicated by the letter X on the census list.

[21] It seems that no distinction was made between the *Brevet élémentaire* (three years of schooling after completion of compulsory education) and the *Brevet supérieur* (five years of schooling).

recorded[22], 91.4% had a basic education: they were at least able to read and write (i.e., were classified in level 2 or, in most cases, in level 3). Only 2.4% had obtained the *Brevet* and 2.2% the *Baccalauréat* or more. At the other extreme, 1% could only read and 3% were illiterate. These proportions did not vary greatly across conscription classes.

Occupation

At the time of their registration on recruitment lists, 94.1% of conscripts were economically active, 4% were inactive (including 3.1% still in education), and 1.9% were in an unknown situation. Looking at the employment structure, it appears that 40.4% of those at work were employed in agriculture (including forestry and fishing), 37.9% in industry or craft, and 21.7% in services. Similar proportions were observed in the whole male workforce in 1911 (39.9%, 37.5% and 22.6%, respectively)[23]. At least 14.1% of those in agricultural occupations were farm workers (either daily workers or workers in more permanent positions) or farm servants[24]. The conscripts earning their living as industrial workers or craftsmen were mainly employed in five subsectors: metalworking / mechanics / electricity (24.5%), construction (23.3%), food (14.5%), textile / clothing / leather (14.3%), and woodworking (7.5%)[25]. It can be noted that 5% of these conscripts appeared on military lists as unskilled labourers (*manœuvres*). As regards those working in the services sector, the data indicate that almost half of them (47.3%) were involved in trades or transport activities.

Court convictions; military convictions

Only a small minority of conscripts (5.4%) had received convictions in civilian life (before or after military service). In most cases, charges were for minor offences (such as hunting/fishing offences or railway offences). The proportion of conscripts with military convictions was even lower. Indeed, less than 1% of them (0.9%) appeared before a military court in the pre-war years. Most of these men were sentenced for draft-dodging or desertion.

4.2. War experience

Initial assignment and rank

When the war broke out, as already stated, 75.5% of men in the sample were fit for armed service. An additional 8.5%, who were unfit at that time, were classified as fit by medical boards in the following months or years[26]. Not all these men, however, joined the forces. Indeed, a number of them entered the war, not as soldiers, but with a civilian assignment. Thus, among those who were fit in August 1914, 5.7% were required to remain in their peacetime jobs (*affectation spéciale* or *sursis*). The majority were employed in railway companies or in the Post and Telegraph administration. Similarly, among those who were subsequently declared fit, 2.7% did not join their units but were sent on secondment to work in factories or mines (*détachement*).

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[22] The proportion of missing cases on education amounts to 13.2%.

[23] Author's computations from the 1911 Census.

[24] In pre-war censuses, a distinction was made between farm owners (*patrons*) and farm workers. In 1911, the share of farm workers in the agricultural workforce amounted to around 45%. The data from military records do not allow for this distinction. Indeed, most of the conscripts working in agriculture were simply recorded as farmers (*cultivateurs* or, much more rarely, *agriculteurs*), without mention of their status. Many of them were probably involved in their parents' farm. In the present study, the conscripts explicitly identified as farm workers are considered as employees of lower social status, together with daily workers and farm servants.

[25] Information is missing in 8.2% of cases.

[26] Most of these reclassifications from unfit to fit status occurred in Autumn 1914 – as shown by the rise in the proportion of conscripts considered fit at the beginning of 1915 (Figure 1) – or, to a lesser extent, in Spring 1917.

Two thirds of the men who served as soldiers at the beginning of the war were assigned to infantry: 54.4% were in "line" infantry regiments and 12% in various other units (territorial infantry regiments, battalions of *chasseurs*, battalions and regiments of French African infantry, colonial infantry regiments or colonial battalions). Artillery was the second most important branch, with 15.6% of soldiers (mainly serving in field artillery regiments). Those who did not enter the war as infantrymen or artillerymen were distributed among cavalry (5.9% of soldiers), engineering (3.2%), logistics (3.5%), supply (1.7%), medical units (1.5%), and other branches (2.2%) – including aviation (0.3%).

At the outbreak of war, 84.8% of the men considered fit for armed service were private soldiers (2nd class or 1st class), 8.2% had the rank of corporal or *brigadier*, 5.7% served as non-commissioned officers, and only 1.1% were officers. Among the men who were unfit in August 1914 but were subsequently classified as fit, the proportion of privates was even higher, reaching 99%.

Changes in fitness status; changes of assignment and rank

It was noted above that a non-negligible number of conscripts had moved from fit to unfit for armed service or *vice versa* before the war. Many changes of status also occurred during the conflict. Indeed, in addition to the reclassifications from unfit to fit status already mentioned, transitions between armed service, auxiliary service and medical discharge were frequently observed among soldiers who were wounded or became ill. When looking at the distribution according to military fitness at the beginning of each quarter of the war period of 1914-1918 (i.e. from 1914-Q3 to 1918-Q4), in the subsample of conscripts who were able to fight in August 1914, it appears that the proportion of men still considered fit for armed service (or reclassified as fit), among those still alive, decreased regularly over the course of the war (Figure 2). In Autumn 1918, this proportion had fallen to 82.9%.

Many servicemen experienced assignment changes during the war. First of all, it should be noted that 8.5% of the men fit for armed service who joined the war as soldiers (in August 1914 or later) subsequently moved to a civilian position[27]. Most of them were recalled from the front to work in factories. But the data also highlight that a much higher proportion of soldiers changed units during their service. Indeed, among those who were never assigned to a civilian position, more than a half (55.5%) experienced at least one change of regiment. Some of these soldiers remained in their original arm of service (having been, for example, transferred between infantry regiments) while others moved from one branch of the Army to another (from infantry to artillery, from cavalry to aviation, etc.). Over the war period, among men who were in active armed service in August 1914, the proportion of soldiers assigned to line infantry regiments decreased substantially, from 54.4% at the beginning of the conflict to 40.7% in Autumn 1918 (Figure 3)[28]. At the same time, there was a rise in the proportion of artillerymen, from 15.6% to 27%, which might reflect, at least in part, the increasing role of this arm on the battlefield[29].

As regards rank changes, the data reveal that 21.5% of the men considered fit for armed service in August 1914 were promoted to a higher rank during the conflict. Of these, 67.2% received only one promotion, 26.9% received two, and 5.9%, three or more. In Autumn 1918, 73.6% of those still alive served as privates, 11.3% served as corporals or *brigadiers*, and 15.1% were officers or non-commissioned officers (3.1% and 12%, respectively).

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[27] In total, among the conscripts who were fit in August 1914 or who were classified as fit in the following months or years, 13.2% found themselves in a civilian assignment at one time or another.

[28] The proportion of soldiers serving in other infantry units, by contrast, remained stable.

[29] Nearly one fifth (19.2%) of the soldiers who were in line infantry regiments in August 1914 no longer served in such regiments in Autumn 1918. The distribution according to their assignment in 1918-Q4 was as follows: other infantry units (6.7% of soldiers), artillery (5.6%), engineering (2.5%), logistics or supply (2.1%), aviation (1%), other branches (1.3%).

Marking events

Soldiers' trajectories during WW1 may have been punctuated by a number of marking events. War wounds are among those that first come to mind. In the sample studied, among the soldiers who survived the conflict, more than one third (34.9%) were wounded on the battlefield. This includes not only bullet and shell wounds but also gas injuries (3.5% of soldiers). Of those wounded, 72.7% were wounded once, 20.3% twice, and 7% three times or more. Some soldiers were also injured in accidents during their service. When combining war wounds and accidental injuries, the proportion of soldiers wounded in WW1, among those still alive at the end of the war, rises to 37%. As mentioned above, after being wounded, some of these men were medically discharged (temporarily or definitely) or assigned to auxiliary service. Others were declared unfit for infantry duty and transferred to other arms or services.

Falling into enemy hands was another key event in soldiers' trajectories. The data from military records indicate that one tenth (10.2%) of the men who joined the war as soldiers were made prisoners during the conflict. This proportion was higher among those who were able to fight in August 1914 than among those who were declared fit in the following months or years (11% as against 6%). This is not surprising since the soldiers in the latter group did not take part in the war of movement in 1914, where the risk of capture was greater. Some of the prisoners, seriously wounded[30] or ill, were repatriated to France before the end of the war, but the great majority remained in captivity until the Armistice.

Crimes or offences committed during service, and associated convictions, should also be mentioned here, even if only a small minority of soldiers experienced such events. Thus, only 1% of them were declared deserters during the war. Similarly, less than 1% were classified as draft-dodgers. The proportion of men sentenced by a military court (for desertion or other crimes/offences), among those in armed service, amounted to 1.7%. In the sample studied, ten soldiers were condemned to death. Two of them were executed[31].

4.3. Deaths

4.3.1. General observations

Of the 21,774 conscripts in the whole sample, 4,979, or 22.9%, died during WW1. This includes all deaths from any cause (even those not considered as attributable to war service) that happened between August 1914 and October 1919[32]. When restricting the sample to men able to fight (in August 1914 or later), the proportion increases to 24.5%.

Not surprisingly, mortality was three times lower among those who entered the war with a civilian assignment. Indeed, 8% of them lost their lives during the conflict, as against 25.4% of those who joined the forces. Among the latter, some were obviously more exposed than others. Thus, when distinguishing according to initial assignment, the data reveal large differences in the proportion of deaths across military branches (Table 2). The highest proportions are found in infantry units (with the exception of territorial infantry), with around one third of deaths: 31.7% in line infantry regiments, 32.2% in battalions and regiments of French African infantry, 34.4% in battalions of *chasseurs*, and 36.3% in colonial infantry regiments or colonial battalions[33]. At the other extreme, the proportion of deaths was

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[30] A non-negligible proportion of the soldiers wounded on the front were captured by the enemy.

[31] According to the "Shot in the First World War" database of the French Ministry of the Armed Forces, a total of 661 soldiers born in metropolitan France were sent before a firing squad (or summarily executed) during the Great War. See Guillot and Parent (forthcoming).

[32] In France, the official ending date of the conflict was set to October 24, 1919 (*loi du 23 octobre 1919 relative à la date de la cessation des hostilités*).

[33] These proportions are those observed among men who were considered fit in August 1914 or subsequently.

below or close to 10% in logistics units (6.8%), territorial infantry (9%), and artillery (9.9%). By contrast, differences according to initial rank are small. It appears that 27.1% of the men who joined as officers did not survive the war, as against 24% of those who entered the conflict with the rank of non-commissioned officer, and 24.5% of those who began as privates or corporals (or *brigadiers*)[34].

As already noted by Guillot and Parent (2018), more than half (56.9%) of deaths occurred in 1914 or 1915. The first two months of the war, marked by two major battles (the Battle of the Frontiers and the Battle of the Marne), were the most murderous, with around 8% of deaths in August 1914 and 10% in September 1914. When examining soldiers' survival times using non-parametric methods of duration analysis[35], one can observe that the conditional risk (or hazard rate) of death was higher in months 1 and 2 than in any other month of the war period (Figure 4). There were also peaks, but less pronounced, in months 14 (September 1915 – Battle of Champagne), 26 (September 1916 – Battle of the Somme), 33 (April 1917 – *Chemin des Dames* Offensive), and 51 (October 1918 – Battle of the Aisne).

Nearly two thirds (65.3%) of the men fit for armed service who died during the war were killed in action or reported missing. 17.3% succumbed to their wounds, 11.2% died of illness (contracted during service or not), and 6.2% died of other or unknown causes. Similar proportions were reported by Guillot and Parent (2018).

4.3.2. Differences across socioeconomic groups

Military records contain no information on income or wealth. Soldiers' socioeconomic status can however be measured by the three following factors: family background, education, and occupation (at the time of conscription). The descriptive analysis shows significant differences in mortality according to these factors.

It appears that the proportion of deaths was 6 points higher among soldiers with a particularly disadvantaged background, that is, who were born out of wedlock and/or were placed in public care during childhood (30.2%, as against 24.1% among those who grew up in a traditional family). Similarly, there was a 7-point difference in mortality between soldiers who were illiterate (i.e. unable to read or write) and those with more than basic education (i.e. who had at least the *Brevet*) (29.6% as against 22.3%). When taking account of war wounds and other injuries, one can note that 39.3% of the illiterate came through the war unscathed (at least physically), compared with 52.2% of the higher educated.

As initially pointed out by Marin (1920), there were more deaths among men who worked in agriculture than among those who worked in the industry/craft sector and those employed in services (Table 3). The differences amount to 6 and 4 points, respectively[36]. At a more detailed level, no significant

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[34] The overall proportion of deaths in the French Army was 18.5% among officers, as against 16% among other servicemen (Marin, 1920, p. 60). When focusing on combat branches, and after excluding indigenous soldiers, the difference is slightly larger: 22.1% as against 17.9%. In Marin's report, one can read that the latter proportion was 15.8% (Ibid., p. 61). But the numbers mentioned by the author (p. 61) give a proportion of 17.9% (1,221,000 dead among the 6,830,000 men called to arms).

[35] For an introduction to duration analysis (also known as "survival analysis" or "event history analysis"), see, for example, Kiefer (1988).

[36] According to Marin's report, of the 1,383,000 men in the Army who died during WW1 (figure as of June 1, 1919), 673,700 were employed in agriculture and 267,400 in industry (Marin, 1920, p. 62 & pp. 88-89). When comparing deaths to the numbers of men mobilised – 3,586,000 and 2,338,000, respectively – (Ibid., p. 87), we find a 7-point difference in mortality between agricultural and industrial professions. This absolute difference is similar to that observed here. By contrast, in relative terms, the aggregate data suggest that the ratio of deaths was 64% higher among men employed in agriculture than among those employed in industry, while the present analysis shows a difference of 27 or 28%. However, these two sets of figures may not be strictly comparable, since, in the aggregate data, all classes of conscripts were included. Indeed, it appeared impossible to restrict the focus to conscripts of the classes of 1900 to 1914, as is done in the present work. Furthermore, there are some problems in these data. In particular, it can be noted that men employed in mines and quarries – 168,400 workers – (Ibid., p. 87) were distinguished from industrial workers in the mobilisation numbers, but (apparently) not in the mortality figures.

difference in mortality was found between farmers and farm workers or farm servants. By contrast, in the industry/craft sector, mortality was significantly higher among unskilled labourers than among other workers, with the proportion of deaths in this subgroup being close to that observed in the agri-culture sector. Conversely, those with higher positions in industry, namely plant managers, engineers and technicians, experienced lower mortality. An even finer analysis reveals significant variability across industry/craft subsectors. In particular, it appears that the proportion of deaths was around 16% among workers employed in the metalworking/mechanics/electricity subsector, as against 22 or 23% among those involved in food production, textile/clothing/leather manufacturing or woodworking, and 25% among construction workers. Within the services sector, the differences appear less pronounced.

The data also indicate that the proportion of men who survived the war without being wounded was 10 points lower among farmers than among industry/craft workers (excluding unskilled labourers) (41.7% *vs* 52.4%). If one compares farmers to workers in the metalworking/mechanics/electricity subsector, this difference increases to 25 points.

These observations are based on simple bivariate statistics. The question is whether the differences in war mortality across socioeconomic groups remain significant when other key factors are simultane-ously taken into account.

5. Regression analyses

5.1. Methodological approach

This part of the study aimed to identify factors that influenced (1) fitness for armed service, (2) assign-ment to a civilian rather than military position, (3) assignment to an infantry unit, and (4) mortality du-ring the war, with the emphasis being placed on the role of soldiers' socioeconomic status.

The first three issues, considered separately, were explored using logistic regressions. As regards mili-tary fitness, two regressions were estimated on the whole sample ($N = 21,774$). The dependent variable of the first regression (regression 1.1) was coded 1 if the individual was fit for armed service at the outbreak of war (0 otherwise). The dependent variable of the second regression (regression 1.2) took the value of 1 if the individual was considered fit in August 1914 or in the following months or years (0 otherwise). The analysis relating to civilian assignments was carried out on two subsamples: the subsample restricted to men who were fit for armed service in August 1914 ($N = 16,440$ – regression 2.1) and the subsample that includes all men who were considered fit in August 1914 or subsequently ($N = 19,570$ – regression 2.2). In both cases, the dependent variable was coded 1 if the individual was assigned to a civilian position (*affectation spéciale / sursis / détachement*) at one time or another du-ring the war (0 otherwise). The third analysis, which focused on infantry assignment, also relied on two subsamples. These subsamples ($N = 15,510$ and $N = 18,556$, respectively) only differ from the two above-mentioned ones in that they exclude men who were in civilian positions at the beginning of their wartime service. The dependent variable in this analysis took the value of 1 if the individual, considered fit for armed service, was initially assigned to an infantry unit (0 otherwise). This arm was defined both in a narrow sense, i.e. as referring only to line infantry regiments (regressions 3.1 and 3.3), and in a broad sense, i.e. as including all units of foot soldiers (regressions 3.2 and 3.4).

In these regressions, the following individual characteristics were included as explanatory variables: recruitment class, region of recruitment (military region), family background, height, education level, occupation, and whether the conscript had received at least one conviction before the war (Table 1). All these variables, except the last, were defined as sets of dummies.

The analysis of war mortality was carried out using both logistic regressions and duration models. This analysis was performed on the two subsamples of men declared fit for armed service (with $N = 16,440$

and $N = 19,570$, respectively). The dependent variable of the logistic regressions was set to 1 if the individual died during the war (0 otherwise). As a first step, the probability of death was expressed as a function of the same set of covariates as above (regressions 4.1 and 4.3). Then, two additional factors were included in the analysis (as sets of dummies): the individual's initial assignment (i.e. at the beginning of his wartime service) and his initial rank (regressions 4.2 and 4.4).

In addition to these logistic regressions, two types of duration models were used: Cox regression models (regressions 5.1 to 5.4) and piecewise constant hazard rate models (regressions 6.1 to 6.4). These are proportional hazards models. The first are continuous-time models while the second are discrete-time models.

The regression model proposed by Cox (1972) is written as:

$$h(t|X_i) = h_0(t)\exp(X_i\,\beta)$$

Where $h(t|X_i)$ is the risk of death at time t for individual i, or hazard rate, $h_0(t)$ is the baseline hazard rate (i.e. when the covariates are all equal to zero), which is left unspecified, X_i and β are the vectors of explanatory variables and associated parameters, respectively. In the present case, the covariates were the same as those in the logistic analysis (with initial assignment and rank being included in a second step, i.e. in regressions 5.2 and 5.4).

In a piecewise constant hazard rate model[37], the time axis is divided into J intervals $[a_{j-1}, a_j)$ (with $a_0 = 0$ and $a_J = \infty$). The hazard rate is assumed to be constant within each interval but may vary from one interval to another. Following Prentice and Gloeckler (1978), the model can be specified as:

$$h_j(X_{ij}) = 1 - \exp[-\exp(X_i\,\beta + \gamma_j)]$$

Where $h_j(X_{ij})$ is the risk of death in the jth interval, and γ_j is the baseline hazard for the interval (Jenkins, 1997). Unobserved heterogeneity can be incorporated into the model via a random variable, θ_i, assumed to be Gamma distributed with mean 1 and variance σ^2 (Meyer, 1990). This was the procedure followed here.

In this part of the analysis, the observation window was restricted to the period from August 1914 to November 1918[38]. This period was divided into quarters, which means that the baseline hazard was represented by a set of 18 dummy variables (with 1914-Q3 as reference). Two models were estimated: a model with the same variables X_i as in the first specification of the logistic and Cox regressions, i.e. without the assignment and rank dummies (regressions 6.1 and 6.3), and a model in which fitness status, assignment, and rank were added (regressions 6.2 and 6.4). These variables were measured at the beginning of each quarter and thus treated as time-varying predictors. It should be noted that fitness status and assignment were not included as separate factors. A combined variable was created to indicate whether the individual was unfit, fit for auxiliary service or fit for armed service, and, if classified as fit for armed service, whether he served as a soldier and in which branch of the Army.

Logistic and Cox regression models were estimated using the LOGISTIC and PHREG procedures of the SAS software (version 9.3; SAS Institute, Inc., Cary, NC, USA). The estimation of the discrete-time models was performed with the *pgmhaz8* routine (Jenkins, 1997, 2004) in STATA (version SE-15.1; StataCorp, College Station, TX, USA)[39].

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[37] For an introduction to this type of model, see Allison (1995), pp. 104-109.

[38] All deaths that occurred after the Armistice were therefore not considered here.

[39] The results are given in Tables 4 to 9. The effects of some factors were quantified as odds ratios (OR) or hazard ratios (HR) and mentioned in the text.

5.2. Results

5.2.1. Fitness for armed service

The regressions presented in Table 4 shed some light on factors that influenced (or were correlated with) conscripts' fitness status. Foremost among these was the individual's height. The results indicate that men of small stature, especially those under 155 cm, were less likely to be declared fit for armed service compared to the reference category (men with height of 165-170 cm). The same was true, but to a lesser extent, for those who were much taller than the average conscript (i.e. at least 175 cm). The (negative) effect associated with short stature (under 155 cm) appears more pronounced when considering fitness in August 1914 (regression 1.1) rather than fitness throughout the war (regression 1.2) (OR of 0.28 vs. 0.42). At the end of the 19th century, young men whose height was below 154 cm could be deferred from military service[40]. Although this explicit reference to a minimum height was removed from the law in 1901, exemptions or deferments for insufficient height continued to be granted during the pre-war years. It should also be noted that short stature was often accompanied by physical weakness (the main cause of unfitness, as seen above). Similarly, the prevalence of respiratory diseases was relatively high among conscripts with tall stature, which might explain, at least in part, why these men were a little less likely to serve in the Army.

The conscripts of the classes of 1910, 1911 and 1912 had a higher probability of being considered fit in August 1914 than their elders of the class of 1900 (taken as reference). In contrast, at the outbreak of war, the young men of the class of 1914, and to a lesser extent those of the class of 1913, were less likely to be classified as able to fight. However, this was no longer the case in the following months or years, as shown by the results of regression 1.2. Interestingly, the probability of being declared fit for armed service was found to be higher in some military regions than in others. These differences across regions may simply reflect disparities in the population's health status, but one cannot exclude that local draft boards may have differed in their propensity to grant exemptions and deferments.

While none of the family background dummies prove to be significant in regression 1.2, the results from regression 1.1 indicate that the probability of being fit in August 1914 was lower among conscripts with one or both parents deceased (but not among those born out of wedlock and/or placed in public care during childhood). The analysis also reveals that men with less than basic education, especially those who were not able to read or write, were less likely to be judged fit (both in August 1914 and in the following months or years). By contrast, the higher educated conscripts (i.e. those classified in level 4 or 5) did not significantly differ from the reference category (level 3). As regards occupation, it appears that men employed in the tertiary sector, with the notable exception of those involved in transport activities, had a lower probability of being declared fit than farmers or workers in forestry /fishing (reference category). The same was true for industry/craft workers (other than unskilled labourers) but only according to regression 1.2. Here again, these differences may partly stem from health disparities. However, the lower probability of being classified as fit among some occupational groups (bank employees and office clerks, as well as, but to a lesser extent, civil servants, medical professionals and teachers, considered as a whole) also raises the question of possible inequalities in chances of avoiding armed service across social categories.

Finally, the results of regression 1.2 reveal that conscripts who had received convictions in civilian life were more likely to be declared fit for armed service. This suggests that these men, or at least some of them, may have not been treated with the same impartiality as other conscripts when they appeared before a medical board, particularly after the outbreak of war.

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[40] See Article 27 of the law of 15 July 1889 on the Recruitment of the Army.

5.2.2. Assignment to a civilian position

As mentioned above, the second analysis aimed to identify factors (positively or negatively) associated with having been assigned to a civilian position during the conflict (whether from the beginning or after some time). The results of this analysis are given in Table 5. According to regressions 2.1 and 2.2, the probability of assignment to a civilian position was significantly lower for men belonging to the youngest classes (i.e. those who were in the Active Army (classes of 1911, 1912 and 1913) or who were about to be called up for service (class of 1914) when the war broke out), as well as, but to a lesser extent, for those of the classes of 1906 to 1910 (compared to the class of 1900). This probability also varied across military regions, which might in part reflect differences in the employment structure.

Conscripts' occupation, indeed, appears to have been a key factor here. Thus, conscripts employed in the industry/craft sector were substantially more likely to be assigned to jobs in the rear than farmers (or workers in forestry/fishing). This was also the case for those involved in transport activities and those working as civil servants, medical professionals or teachers. The results from regressions 2.1 and 2.2 show odds ratios of 2.9 to 3.6. Perhaps surprisingly, farm workers or servants also had higher chances of serving in a civilian position compared to farmers (OR = 1.9). According to regression 2.2, merchants and trade employees were the only occupational category that were somewhat less likely than farmers to be employed in the rear (effect significant at the 10% level).

Two other factors were associated with a lower probability of assignment to a civilian position: being unable to read or write and (at the 10% level) having received at least one conviction before the war. Conscripts who were illiterate were probably less employable than those with at least a basic education. The fact that men with a criminal record were also less likely to be kept away from the front seems in line with what was observed in the previous analysis.

5.2.3. Infantry assignment

The four regressions relating to infantry assignment are presented in Table 6. As can be seen, the results with the broad definition of infantry (regressions 3.2 and 3.4) do not greatly differ from those obtained using the narrow definition (regressions 3.1 and 3.3). According to this analysis, conscripts' height was the main factor affecting their probability of being initially assigned to an infantry unit during the war. Indeed, the shorter conscripts were, the more likely they were to serve in this arm. In the first subsample (men considered fit for armed service in August 1914), the effect associated with short stature (less than 155 cm) is particularly strong, especially when the broad definition is used (OR of 7.2 in regression 3.2, as against 3.8 in regression 3.4). This (inverse) link between height and infantry assignment probably stems from the minimum stature requirements that were (explicitly or implicitly) applied in other arms (cavalry and artillery).

The results of this analysis also indicate that the probability of joining the war as an infantry soldier was slightly higher in some military regions (if one defines infantry in a narrow sense) and in some classes of conscripts (especially the class of 1912). Similarly, when looking at socioeconomic factors, it appears that the less educated were more likely to be assigned to an infantry unit than those with a standard level of education (level 3). This latter observation should however be nuanced. Indeed, according to regressions 3.1 and 3.3, those who held the *Brevet* (level 4) also had a higher probability of serving in the infantry. As in the two preceding analyses, the results show differences across occupational groups. Industry/craft workers (other than unskilled labourers) were less likely than farmers to serve as infantry soldiers. The same was true for men with higher positions in industry (although this variable did not appear significant in regression 3.3) and for those working in the transport sector. Conversely, the probability of being assigned to an infantry unit was found to be higher for unskilled industrial labourers than for farmers, but only in regressions 3.2 and 3.4.

According to regression 3.3, having received at least one conviction in civilian life was associated with a lower probability of serving in the infantry. The results of regressions 3.2 and 3.4 show, on the contrary, a positive link between convictions and infantry assignment. Not surprisingly, this indicates that men with a criminal record were more likely to join infantry units other than line infantry regiments. It should be kept in mind that among these units were the *Bataillons d'infanterie légère d'Afrique* (the so-called "Bat d'Af"), in which were usually placed those who had been sentenced to imprisonment.

5.2.4. War mortality

Results of the logistic and Cox regression models

Turning now to the analysis of war mortality, it should first be noted that the results of the logistic regressions (Table 7) are very similar to those of the Cox regressions (Table 8). Indeed, the estimated effects point in the same direction and are of the same order of magnitude in both types of models.

This analysis indicates that soldiers who served in the Active Army at the outbreak of war (i.e. those of the classes of 1911, 1912 and 1913) were more likely to die during the conflict than the reservists of the class of 1900 (reference category). This was also true, to a lesser extent, for the recruits of 1914 and for the youngest reservists (classes of 1907 to 1910). The risk of death was highest within the class of 1912 (OR = 1.9; HR = 1.8)[41], followed by the class of 1913 (OR = 1.7; HR =1.6) and the class of 1911 (OR = 1.6; HR = 1.5)[42]. As could be expected, joining the war with a non-infantry assignment had a strong effect on the chances of survival. Men initially assigned to civilian positions were four or five times less likely to lose their lives than those serving in line infantry regiments (reference category) (OR = 0.20/0.21; HR = 0.23/0.24)[43]. Among soldiers who joined the forces, those assigned to logistics units had the lowest risk of death (OR = 0.17; HR = 0.19), followed by artillerymen (OR = 0.23; HR = 0.26). As observed in the descriptive analysis (Subsection 4.3.2), the risk of dying was also much lower in territorial infantry regiments than in line infantry regiments (OR = 0.23/0.27; HR = 0.25/0.29) or in other units of foot soldiers. The most likely to die during the war, among infantrymen, were those assigned to colonial infantry units (OR = 1.2/1.3; HR = 1.2).

The risk of death also varied by rank. Men who joined the war as second lieutenants were more likely than privates (reference category) to not survive (OR = 1.8/1.9; HR = 1.7/1.9). The same was true for those who initially served with the rank of non-commissioned officer, but to a lesser extent (OR = 1.2/ 1.3; HR = 1.2). By contrast, the risk of dying was not found to be significantly higher among those who joined as lieutenants or captains (except in regression 5.4, at the 10% level).

The results show no real differences across military regions. Indeed, only two of the corresponding dummies appeared significant at the 5% level: the dummy for Region III (in regressions 4.4 and 5.4) and the dummy for Region IV (in regressions 4.2 and 5.2).

According to this analysis, short stature (less than 155 cm) was associated with a higher risk of death. However, the estimated effect was substantially reduced (and no longer significant in regressions 4.4 and 5.4) when the assignment and rank dummies were included as predictors. It can also be noted that tall soldiers (at least 175 cm) did not have greater chances of surviving the war than those with height of 165-170 cm (i.e. of average height or slightly taller).

Concerning socioeconomic factors, the results indicate that soldiers coming from a disadvantaged family background (i.e. who were in non-standard situations at birth or/and during childhood) were more likely to die during the war compared to the reference category (OR = 1.3; HR = 1.2), which confirms what was observed in the descriptive statistics. Similarly, in line with the findings reported above, the

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[41] These estimates are from regressions 4.2/4.4 and 5.2/5.4 (i.e. with the assignment and rank dummies).

[42] For the class of 1914, the corresponding values are 1.5 (1.6 in regression 4.4) and 1.4.

[43] OR of 0.20 in regression 4.2 and 0.21 in regression 4.4; HR of 0.23 in regression 5.2 and 0.24 in regression 5.4.

present analysis reveals differences in the risk of death across occupational groups. It appears from regressions 4.1/4.3 and 5.1/5.3 that men employed as industry/craft workers in civilian life were less likely to die than those in agricultural occupations (OR = 0.70/0.72; HR = 0.73/0.75). This effect remained significant (at the 1 % level), though of smaller magnitude, after controlling for initial assignment and rank (OR = 0.80/0.81; HR = 0.83/0.84). Men with higher positions in industry (i.e. plant managers, engineers and technicians) also had more chances to survive. However, in regressions 4.2/4.4 and 5.2/5.4, the dummy for this group only appeared significant at the 10% level[44]. According to regressions 4.1/4.3 and 5.1/5.3, the risk of dying did not differ between unskilled industrial labourers and farmers (which is in line with the descriptive analysis). By contrast, the results of regressions 4.2/4.4 and 5.2/5.4 seem to indicate that the former, like other industry/craft workers, had greater chances of surviving (effect significant at the 10% level). Compared to farmers, men employed in the tertiary sector were also less likely to lose their lives (odds/hazard ratios in the range of 0.67 to 0.90, according to regressions 4.2/4.4 and 5.2/5.4). The only exception was transport workers. Indeed, after accounting for initial assignment and rank, no difference in risk was found for this group[45].

The descriptive results showed that mortality was higher among the less educated. This observation was not confirmed in the multivariate analysis. All the education dummies (except the dummy for missing values) appeared non-significant. Similarly, according to this analysis, soldiers who had received at least one conviction in civilian life had the same risk of death as those with no criminal record.

Results of the piecewise constant hazard rate models

The estimated parameters of the discrete-time models with unobserved heterogeneity are presented in Table 9. The variance of the heterogeneity term was found significant at the 1% level in regressions 6.1, 6.2 and 6.4, and at the 10% level in regression 6.3.

As in the logistic and Cox regression models, the results show a strong link between type of assignment (treated here as a time-varying covariate) and mortality. When servicemen were assigned to a civilian position, their risk of dying in quarter t was 89% lower (regression 6.2 – HR = 0.11) or 67% lower (regression 6.4 – HR = 0.33) than in the reference situation (unfitness for armed or auxiliary service, i.e. deferment, discharge or exemption). Not surprisingly, being assigned to auxiliary service also increased the chances of surviving (HR = 0.15/0.27). For those in active service, the risk of dying was much higher in infantry units, particularly in regiments of *chasseurs* (HR = 4.1/9.0) and in colonial infantry regiments (HR = 3.8/8.8), than in the other branches of the Army.

The differences in mortality risk across ranks are more pronounced than in the previous regressions (where only initial rank was considered). Indeed, this analysis shows that the risk of death was higher for sergeants and corporals than for privates, higher for warrant officers than for sergeants and corporals, and higher for officers than for non-commissioned officers. Furthermore, according to regression 6.2, officers with rank of captain were more likely to lose their lives than lieutenants and second lieutenants (HR of 3.5 vs. 2.6 and 2.8, respectively).

As regards the other variables (included as time-invariant covariates), the results of these models are in line with those presented above. In particular, these results confirm the existence of socioeconomic differences in war mortality. Thus, it again appears that soldiers from disadvantaged backgrounds were more likely to not survive the war (HR = 1.5/1.4). Similarly, men who earned their living in agriculture had lower chances of surviving than those who were employed as industry/craft workers or than those who worked in the tertiary sector (if one excludes transport workers). As in the previous regressions, the difference in risk between industry/craft workers (other than unskilled labourers) and farmers was substantially reduced, but remained significant, when controlling for assignment and rank (HR = 0.79/0.84 vs. 0.62/0.69).

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[44] This might be due to the small number of individuals in this group.

[45] The corresponding dummy was significant in regressions 4.1/4.3 and 5.1/5.3, but not in regressions 4.2/4.4 and 5.2/5.4.

Finally, when looking at the coefficients of the time dummies, particularly in regression 6.2 (estimated on the subsample of men considered fit in August 1914), it can be observed that the risk of dying was higher in 1914-Q3, 1915-Q2, 1916-Q3, 1917-Q2 and in the last three quarters of 1918 than during the rest of the period, which is in line with Figure 4.

6. Discussion and concluding remarks

This quantitative study sought to explore the trajectories of French conscripts during the Great War. The data were obtained from military records of more than 20,000 men of the classes of 1900 to 1914. Besides a descriptive analysis, which aimed at providing both a statistical portrait of conscripts and an insight into their wartime paths, regression analyses were performed to identify factors associated with (1) having been declared fit for armed service; (2) having been assigned to a civilian position; (3) having been assigned to an infantry unit; and (4) dying during the conflict. The main objective was to determine whether there were inequalities in combat exposure and mortality between social groups. In this study, conscripts' socioeconomic status was measured through family background, education, and occupation.

The results of the regression analyses on military fitness, civilian assignment, and infantry assignment all suggest that some social groups were more exposed to war violence than others. In particular, it was found that conscripts employed as farmers in civilian life were more likely to be considered fit to fight (and hence to be sent to the front) than industry/craft workers (according to regression 1.2) and than (most of) men working in the tertiary sector. They were also more likely to join the war as infantry soldiers – the most exposed to enemy fire – and had a lower probability to be recalled from the front and assigned to a civilian position. All this may partly explain why mortality was higher in this group. However, the difference in the risk of death remained significant in the multivariate analysis, even after including the assignment and rank dummies. The results also showed that conscripts with less than basic education were more likely to serve in infantry units. Furthermore, those who were illiterate had lower chances of being assigned to jobs in the rear. Nonetheless, the analysis of deaths revealed no significant link between education level and war mortality. By contrast, it emerged from this analysis that conscripts from disadvantaged family backgrounds (i.e. who were born out of wedlock and/or placed in public care during childhood) had a higher risk of dying during the conflict.

The differences in the probability of being declared fit for armed service across occupational groups are probably, for the most part, a reflection of social disparities in health status. The results thus seem to indicate that farmers were on average, at the time of the war, in better health and physical condition than white-collar employees. This may correspond to reality but, as pointed out above, another factor may have played a role, at least at the margin. One can indeed suspect that conscripts in agricultural occupations were less able to use personal or/and family connections to avoid active service than those from other social groups. The same may have been true for unskilled industrial workers. Unfortunately, the data did not contain sufficient information to fully investigate this issue. It was not surprising to observe that farmers were less likely to serve in civilian assignments, whether in August 1914 or subsequently. Their jobs or occupations were not considered essential to the war effort on the "home front", contrary to skilled industrial workers, miners, railwaymen, or Post and Telegraph employees. It also came as no surprise that conscripts employed in agriculture or as unskilled industrial labourers, as well as those with less than basic education, had a higher probability to fight as infantrymen. Indeed, serving in the infantry was a natural assignment for these men, as this arm did not require specific skills, unlike other military branches or services. Even after controlling for whether or not they served in infantry regiments, farmers were found to have lower chances of surviving the war than industry/craft workers and (most of) tertiary employees. Again, a possible explanation is that most of these men lacked the personal resources, and perhaps the social capital, that could have allowed them to be assigned to non-combat duties (Loez, 2012). The same argument can be put forward to explain why the death rate was also higher among conscripts from disadvantaged family backgrounds. This discussion

leads back to the broader issue of the "*embusqués*" (Boulanger, 1998; Ridel, 2007) – all those who managed to avoid the front, or at least to avoid combat roles, by one means or another.

The differences in mortality risk according to family background and occupation, though significant, were of lower magnitude than those associated with military characteristics. Indeed, in this analysis, the soldier's recruitment class, assignment and rank were identified as the main factors influencing mortality during the war. Not surprisingly, the results showed that serving in the infantry strongly increased the risk of dying. The recent studies by Fornasin et al. (2019), McCalman et al. (2019) and Bailey et al. (2023) came to the same conclusion. It was observed here that a conscript who was initially assigned to an infantry regiment had four times less chances of surviving the war than an artilleryman. Regarding rank, the results of discrete-time models revealed that officers were at least twice more likely to lose their lives than ordinary soldiers[46]. Similarly, the risk of dying was twice higher among conscripts who belonged to the Active Army in August 1914 (i.e. those of the classes of 1911, 1912 and 1913) than among the reservists of the oldest classes. By comparison, after controlling for these factors, the differences in mortality risk between farmers and other occupational groups were found to be in the range of 15% to 40%. For conscripts from disadvantaged family backgrounds, the analysis showed odds/hazard ratios of 1.2 to 1.5.

As regards rank, one should note that almost all the officers in the sample studied were junior officers (i.e. below the rank of commandant). These officers were generally on the front line with their men. They had to lead by example and therefore often had to take more risks than ordinary soldiers, which could explain why they were less likely to survive. Officers' mortality was also especially high in the British Army (Winter, 1977). According to Bailey et al. (2023), the average monthly death rate during WW1 was 7.76 per thousand among officers, as against 3.12 per thousand among soldiers of other ranks. Given that many officers in the British Army were well-educated men, from well-to-do backgrounds, it has been said that *"the Great War produced a 'Lost Generation' of social elites"* (Winter, 1977, p. 465). The social profile of French officers was probably quite similar to that of their British counterparts. Thus, in the present sample, while only 2.3% of ordinary soldiers had received more than basic education, half of officers (51.9%) held at least the *Brevet* or the *Baccalauréat*[47]. Among those who were in employment at the time of conscription, one fifth (21.3%) were in higher-status occupations (doctors, teachers, engineers, etc.), as against only 1.7% of ordinary soldiers. This therefore highlights that members of privileged classes, as officers, also had a higher-than-average risk of dying during the war. Officers, however, accounted for only a small proportion of the forces (around 3%).

Another factor that was found to have some influence on mortality risk was height (at least among men fit for armed service in August 1914). It was observed that soldiers of small stature were more likely to not survive the war than those of average height or slightly taller. This result remains difficult to explain. It may be that small-statured men, though judged fit, were on average in poorer physical condition than taller men. Another possible explanation could be that these soldiers were most often assigned to (or volunteered for) dangerous duties, such as serving as "runners" (messengers). The literature has provided divergent results on this issue. Kanazawa (2007) found that British soldiers who survived the war were on average taller than those who died. Similarly, the study by Fornasin et al. (2019) showed an inverse relationship between height and war mortality among Italian soldiers. Their results contrast with those of McCalman et al. (2019), on Australian soldiers, who concluded on the contrary that taller servicemen had a higher risk of dying. Bailey et al. (2023), for their part, did not find any significant effect of height.

According to this study, the risk of death did not vary greatly by region of recruitment. This contradicts, to some extent, the results of Guillot and Parent (2018), who found significant geographical differences in soldiers' survival time. It should however be recalled that their sample only consisted of

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[46] McCalman et al. (2019) found no significant effect of rank on mortality. In the two other studies mentioned above, this factor was not included as a covariate.

[47] These percentages exclude missing cases.

servicemen who died in WW1. In order to further examine this issue, the logistic and Cox regression models were re-estimated using *département* dummies instead of region dummies. Only a few of these variables were found significant at the 5% level (results not shown, but available upon request). It was observed that conscripts from the *départements* of *Calvados*, *Côtes-du-Nord*, *Meuse* and *Savoie* were more likely to not survive the war than those from the *Seine* (reference category). By contrast, mortality was lower among those from *Haute-Loire*, *Pas-de-Calais* and *Seine-et-Oise*. It should be pointed out that these results did not support the assertion that Corsica was one of the *départements* that suffered the heaviest toll (Rey, 2014).

Most servicemen who lost their lives during WW1 were killed (or reported missing) in action or died of war wounds (Guillot and Parent, 2018). The proportion of those who died of illness, in accidents or from other causes was, however, far from negligible (amounting to 17% in the sample studied). The analysis presented above did not distinguish between causes of death. As a robustness check, mortality differentials among conscripts were re-examined using a competing risks approach (Allison, 1995; Kalbfleisch and Prentice, 1980), with separate Cox models for combat-related deaths and deaths from other causes. As regards combat-related deaths, the results led to the same conclusions as those from the main analysis. In the regressions on non-combat deaths, few variables were found to have significant effects, which was not surprising given the high proportion of censored cases (over 95%) (results available upon request).

It would be interesting to replicate this study in a larger sample of conscripts. This would make it possible to examine inequalities in war exposure and mortality using a finer classification of occupations. Conscripts' socioeconomic status could also be crossed with the local wealth level. Such an analysis might lead one to qualify some of the present conclusions. Another possible extension to this work would be to study mortality differentials in the post-WW1 years among veterans. Comparisons could be made between surviving soldiers who were wounded on the battlefield (or in accidents) and those who came out unscathed, at least physically, as well as between soldiers who experienced captivity and those who did not. Again, a larger sample size would probably be required to explore this issue.

References

Allison P.D. (1995), *Survival Analysis Using the SAS System: A Practical Guide*, Cary, NC: SAS Institute, 292 p.

Barthas L. (1978), *Les carnets de guerre de Louis Barthas, tonnelier, 1914-1918*, Paris: Librairie François Maspero. Reissue, La Découverte, 1997.

Bailey R.E., Hatton T.J., Inwood K. (2023), "Surviving the Deluge: British servicemen in World War I", *Economics and Human Biology*, vol. 49, April 2023, Article 101216 (DOI: 10.1016/j.ehb.2022.101216).

Barbusse H. (1916), *Le feu. Journal d'une escouade*, Paris: Flammarion, published in English as *Under Fire: The Story of a Squad*, translated by F. Wray, 1917, New York: E.P. Dutton & Co.

Beau L. (2017), "Du local au national: une nouvelle approche des pertes de 1914-1918 par département", *Le Mouvement Social*, n° 259, pp. 59-77.

Boulanger P. (1998), "Les embusqués de la Première Guerre mondiale", *Guerres mondiales et conflits contemporains*, n° 192, pp. 87-100.

Bulletin Officiel du Ministère de la Guerre. Edition méthodique. Recrutement de l'Armée. Dispositions générales I. Volume arrêté à la date du 15 février 1906, Paris: Librairie militaire R. Chapelot et Cie, 188 p.

Chamla M.-C. (1964), "L'accroissement de la stature en France de 1880 à 1960. Comparaison avec les pays d'Europe occidentale", *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, XIe Série, tome 6, fascicule 2, pp. 201-278.

Cox D.R. (1972), "Regression Models and Life Tables", *Journal of the Royal Statistical Society*, Series B, vol. 34, pp. 187-202.

Festy P. (1984), "Effets et répercussions de la première guerre mondiale sur la fécondité française", *Population* (French Edition), vol. 39, n° 6, pp. 977-1010.

Fornasin A., Breschi M., Manfredini M. (2019), "Deaths and survivors in war: The Italian soldiers in WWI", *Demographic Research*, vol. 40, article 22, pp. 599-626.

Gilles H., Guironnet J.-P., Parent A. (2014), "Géographie économique des morts de 14-18 en France", *Revue économique*, vol. 65, n° 3, pp. 519-532.

Guillot O., Parent A. (2018), ""Adieu la vie, adieu l'amour": Analyse des inégalités de temps de survie chez les soldats "Morts pour la France" durant la Grande Guerre", *Population* (French Edition), vol. 73, n° 3, pp. 431-466.

Guillot O., Parent A. (forthcoming), ""On Vient de Fusiller un des Nôtres": A Quantitative Study of Military Executions in the French Army during WW1", *Defence and Peace Economics*. Published online: 29 Sep 2022 (DOI: 10.1080/10242694.2022.2120234).

Henry L. (1966), "Perturbations de la nuptialité résultant de la guerre 1914-1918", *Population* (French Edition), vol. 21, n° 2, pp. 273-332.

Horne J. (1989), "'*L'impôt du sang*': Republican rhetoric and industrial warfare in France, 1914-18", *Social History*, vol. 14, n° 2, pp. 201-223.

Huber M. (1931), *La population de la France pendant la guerre. Avec un appendice sur les revenus avant et après la guerre*, Publications de la Dotation Carnegie pour la Paix internationale, Paris / New Haven: Presses Universitaires de France / Yale University Press, 1 025 p.

Jenkins S.P. (1997), "sbe17. Discrete time proportional hazards regression", *STATA Technical Bulletin*, STB-39, pp. 22-32.

Jenkins S.P. (2004), "PGMHAZ8: Stata module to estimate discrete time (grouped data) proportional hazards models", Statistical Software Components S438501, Boston: Boston College Department of Economics (revised 17 Sep 2004).

Kalbfleisch J.D., Prentice R.L. (1980), *The Statistical Analysis of Failure Time Data*, New-York: John Wiley & Sons, 321 p.

Kanazawa S. (2007), "Big and tall soldiers are more likely to survive battle: a possible explanation for the 'returning soldier effect' on the secondary sex ratio", *Human Reproduction*, vol. 22, n° 11, pp. 3002-3008.

Kiefer N.M. (1988), "Economic Duration Data and Hazard Functions", *Journal of Economic Literature*, vol. 26, n° 2, pp. 646-679.

Loez A. (2012), "Militaires, combattants, citoyens, civils: les identités des soldats français en 1914-1918", *Pôle Sud*, n° 36, p. 67-85.

McCalman J., Kippen R., McMeeken J., Hopper J., Reade M. (2019), "Early Results From the 'Diggers to Veterans' Longitudinal Study of Australian Men who Served in the First World War. Short- and Long-Term Mortality of Early Enlisters", *Historical Life Course Studies*, vol. 8, pp. 52-72.

Marin L. (1920), *Proposition de résolution tendant à charger la Commission de l'Armée d'établir et de faire connaître le bilan des pertes en morts et en blessés faites par les nations belligérantes*, Chambre des députés, 12e législature, Session de 1920, Annexe au procès-verbal de la séance du 29 mars 1920 (n° 633), Paris: Imprimerie de la Chambre des députés, 195 p.

Maurin J. (1982), *Armée – Guerre – Société. Soldats languedociens (1889-1919)*, Paris: Publications de la Sorbonne, 750 p.

Meyer B.D. (1990), "Unemployment Insurance and Unemployment Spells", *Econometrica*, vol. 58, n° 4, pp. 757-782.

Prentice R.L., Gloeckler L.A. (1978), "Regression Analysis of Grouped Survival Data with Application to Breast Cancer Data", *Biometrics*, vol. 34, n° 1, pp. 57-67.

Prost A. (2008), "Compter les vivants et les morts: l'évaluation des pertes françaises de 1914-1918", *Le Mouvement Social*, n° 222, p. 41-60.

Rey D. (2014), "La Corse, ses morts et la guerre de 1914-1918", *Vingtième siècle*, n° 121, p. 49-59.

Ridel C. (2007), *Les embusqués*, Paris: Armand Colin, 350 p.

Sauvy A. (1965), *Histoire économique de la France entre les deux guerres. De l'armistice à la dévaluation de la Livre*, Paris: Fayard, 564 p.

Winter J.M. (1977), "Britain's 'Lost Generation' of the First World War", *Population Studies*, vol. 31, n° 3, pp. 449-466.

Table 1
Sample characteristics

	Men declared fit for armed service		Whole sample
	Fit in August 1914	**Fit in August 1914 or subsequently**	
Recruitment class (%)			
1900	5.99	5.97	6.06
1901	6.88	6.76	6.78
1902	6.77	6.79	6.86
1903	6.89	6.84	6.85
1904	6.85	6.81	6.81
1905	7.02	6.90	6.97
1906	7.15	6.99	7.01
1907	6.81	6.68	6.62
1908	6.95	6.84	6.79
1909	6.40	6.41	6.40
1910	6.03	5.80	5.81
1911	7.23	6.82	6.78
1912	6.52	6.44	6.33
1913	6.54	6.95	7.02
1914	5.97	7.00	6.91
Region of recruitment / Military region (%)			
Paris region	10.09	10.01	10.16
Region I	6.70	6.60	6.72
Region II	3.60	3.34	3.43
Region III	2.93	3.05	3.17
Region IV	2.89	3.21	3.22
Region V	4.04	4.04	3.96
Region VI	3.18	3.07	3.01
Region VII	5.57	5.33	5.17
Region VIII	5.18	4.95	4.89
Region IX	5.12	5.04	4.98
Region X	3.58	3.78	3.87
Region XI	6.96	7.02	6.88
Region XII	5.82	5.69	5.56
Region XIII	6.05	6.42	6.37
Region XIV	4.23	4.16	4.14
Region XV	6.47	6.85	6.89
Region XVI	5.43	5.48	5.44
Region XVII	3.73	3.69	3.76
Region XVIII	5.74	5.77	5.86
Region XIX [a]	-	-	-
Region XX	2.14	1.95	1.97
Region XXI	0.55	0.55	0.55
Family background (%)			
Born out of wedlock / placed in public care: No			
Both parents alive [b]	72.42	71.83	71.56
Father alive, Mother deceased	14.20	14.42	14.57
Father deceased, Mother alive	7.19	7.28	7.36
Both parents deceased	3.14	3.26	3.34
Born out of wedlock / placed in public care: Yes	3.05	3.21	3.17
Height [in cm] (%)			
< 155	1,98	2.68	2.96
155 - 160	11.01	11.73	11.77
160 - 165	27.02	26.56	26.27
165 - 170	30.85	29.92	29.42

170 - 175	18.67	18.06	17.67
≥ 175	6.82	6.74	6.75
Missing information	3.65	4.31	5.16
Education level (%)			
Cannot read or write	2.32	2.50	2.62
Can read	0.78	0.84	0.86
Can read and write	18.09	18.25	18.20
Can read, write and count	63.00	61.89	61.14
Holds the *Brevet de l'enseignement primaire*	2.13	2.11	2.10
Holds the *Baccalauréat* or a higher degree	1.95	1.88	1.89
Missing information	11.73	12.53	13.19
Economic sector / Occupation [b] (%)			
Agriculture, forestry, fishing			
Farmer (incl. winemaker), lumberjack, fisherman	32.84	33.23	32.63
Farm worker, farm servant	5.30	5.28	5.35
Industry, craft			
Artisan, small-industry worker, factory/mine worker	33.72	33.30	33.30
Unskilled labourer	1.78	1.77	1.75
Plant manager, industrial engineer, technician	0.61	0.61	0.62
Services			
Carter, driver, carrier, transport worker	3.74	3.58	3.49
Merchant, trade employee	5.89	6.03	6.19
Bank employee, clerical employee	2.23	2.25	2.41
Civil servant, medical professional, teacher	1.95	1.98	2.00
Others	6.13	6.24	6.36
Owner, annuitant, without occupation, student	3.81	3.85	4.01
Missing information	2.00	1.88	1.89
Criminal record			
At least one conviction before the war (%)	5.49	5.54	5.41
Military status in August 1914 (%)			
Fit for armed service	100.00	84.01	75.50
Fit for auxiliary service	0.00	5.59	8.36
Unfit for service	0.00	10.40	16.14
Initial assignment (%)			
Military assignment			
Line Infantry	51.30	52.39	-
Territorial Infantry	0.74	0.68	-
Chasseurs	4.28	4.10	-
Infantry from French African possessions	2.14	2.06	-
Colonial Infantry / Colonial Battalions	4.16	4.36	-
Cavalry	5.58	5.15	-
Artillery	14.73	13.81	-
Engineering	3.05	3.26	-
Logistics	3.33	3.08	-
Supply	1.55	2.11	-
Medical corps	1.42	1.90	-
Others	0.95	0.86	-
Civilian assignment [c]	5.66	5.18	-
Missing information	1.11	1.06	-
Initial rank (%)			
Private 2nd class soldier	72.20	76.35	-
Private 1st class soldier	12.60	10.69	-
Corporal / *Brigadier*	8.24	6.99	-
Sergeant / *Maréchal des logis* / Warrant officer / *Aspirant*	5.73	4.88	-
Second Lieutenant	0.61	0.52	-
Lieutenant / Captain	0.48	0.41	-
Missing information	0.14	0.16	-
Number of observations	16,440	19,570	21,774

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).

[a] The 19th Military Region included the three Algerian *départements* (Algiers, Constantine, and Oran), not covered by the present study.

[b] At the time of conscription, i.e. when the individual was 20 years old.

[c] This includes: *Affectation spéciale*, *détachement*, and *sursis*.

Figure 1
Sample distribution according to survival status and military fitness status
at the beginning of each quarter of the war period
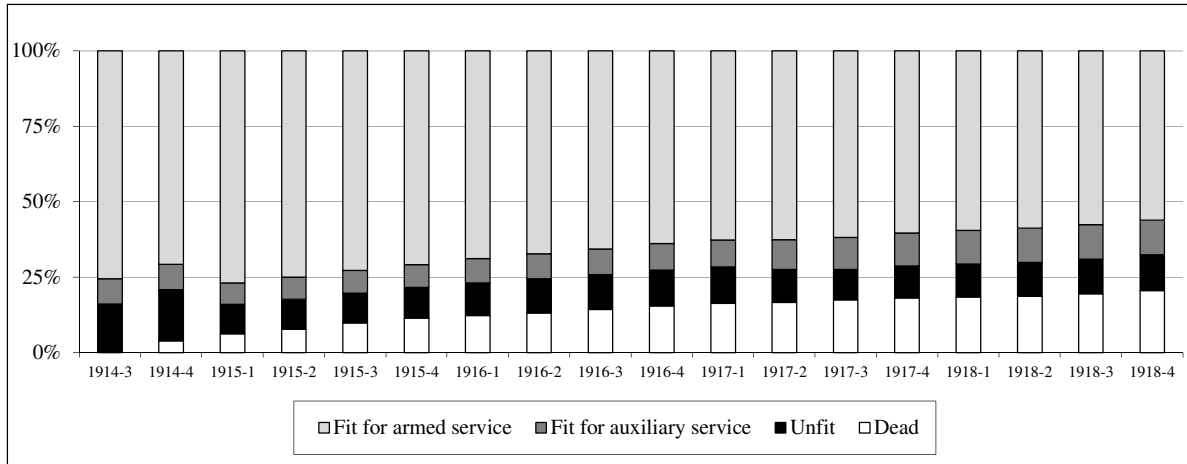
Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).

Figure 2
Distribution of surviving soldiers according to fitness status
at the beginning of each quarter of the war period
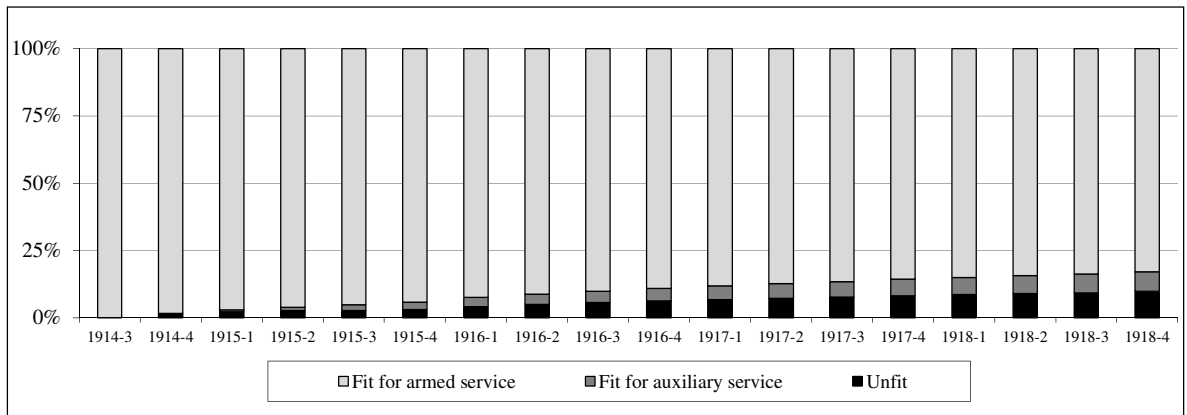
Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample: men considered fit for armed service in August 1914.

Figure 3
**Distribution of surviving soldiers according to branch of service
at the beginning of each quarter of the war period**
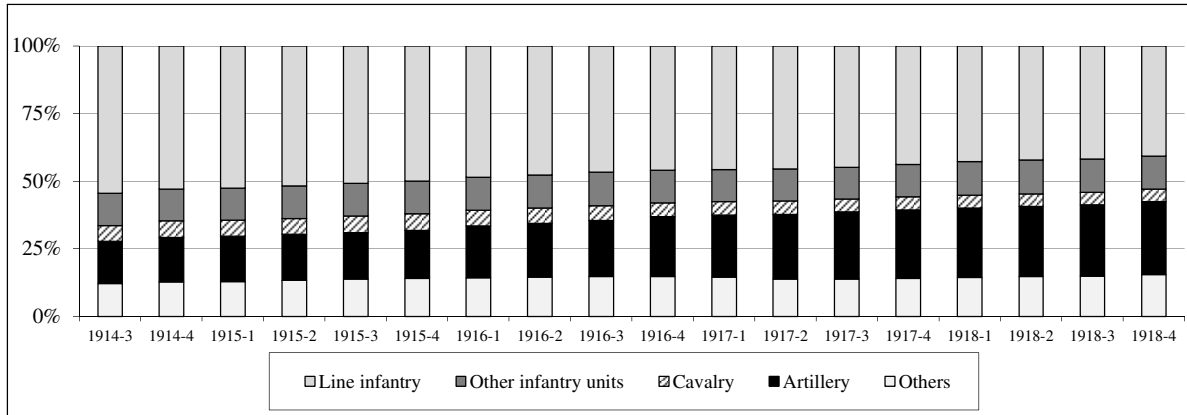
Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample: men considered fit for armed service in August 1914.
Note: soldiers in civilian assignments were excluded.

Figure 4
Hazard rate of death
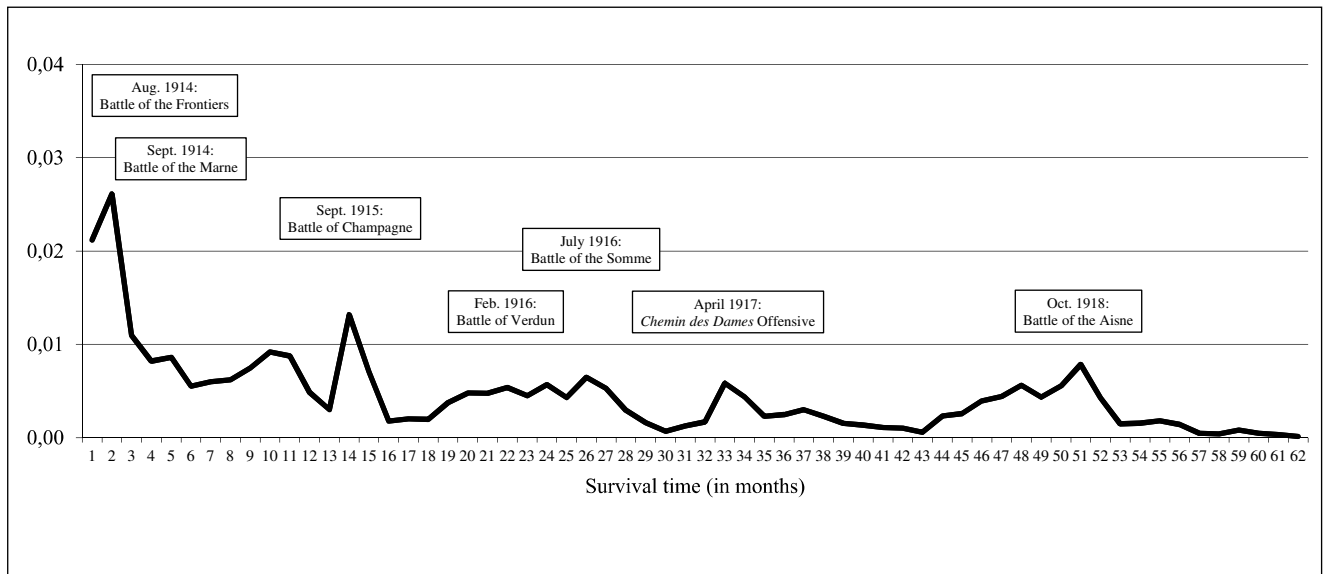
Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample: men considered fit for armed service in August 1914 or subsequently.
Note: survival time was measured from August 2, 1914. The hazard rate was estimated by the life-table (actuarial) method with one-month intervals.

Table 2
Proportion of deaths according to initial assignment (%)

	(1)	**(2)**
Military assignment	26.3	25.4
Line Infantry	33.2	31.7
Territorial Infantry	8.3	9.0
Chasseurs	36.1	34.4
Infantry from French African possessions	33.5	32.2
Colonial Infantry / Colonial Battalions	36.0	36.3
Cavalry	17.3	16.9
Artillery	10.2	9.9
Engineering	14.0	12.6
Logistics	7.1	6.8
Supply	17.3	15.7
Medical corps	11.5	11.6
Others	12.1	11.9
Civilian assignment [c]	8.1	8.0
Missing information	24.0	23.2
All	*25.2*	*24.5*
Number of observations	16,440	19,570

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
(1) Subsample: men considered fit for armed service in August 1914.
(2) Subsample: men considered fit for armed service in August 1914 or subsequently.

Table 3
Proportion of deaths by economic sector / occupation (%)

|	**(1)**	**(2)**	**(3)**
Agriculture, forestry, fishing	28.6	27.7	26.0
Farmer (incl. winemaker), lumberjack, fisherman	28.7	27.8	26.0
Farm worker, farm servant	28.1	27.5	25.7
Industry, craft	22.3	21.8	20.6
Artisan, small-industry worker, factory/mine worker	22.1	21.7	20.4
Unskilled labourer	27.1	26.2	24.6
Plant manager, industrial engineer, technician	18.0	18.3	17.2
Services	24.8	23.8	21.8
Carter, driver, carrier, transport worker	23.7	23.6	22.4
Merchant, trade employee	24.8	23.8	22.0
Bank employee, clerical employee	23.5	21.6	19.1
Civil servant, medical professional, teacher	22.1	21.1	18.8
Others	26.9	25.6	23.4
Owner, annuitant, without occupation, student	22.8	21.6	20.0
Missing information	22.3	23.4	21.4
All	*25.2*	*24.5*	*22.9*
Number of observations	16,440	19,570	21,774

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
(1) Subsample: men considered fit for armed service in August 1914.
(2) Subsample: men considered fit for armed service in August 1914 or subsequently.
(3) Whole sample.

Table 4
Fitness for armed service: Estimated parameters of the logistic regressions

|	(1.1)	(1.2)
Intercept	1.420 ***	2.409 ***
Recruitment class		
1900	*Ref.*	*Ref.*
1901	0.107	0.073
1902	- 0.014	0.014
1903	0.074	0.116
1904	0.057	0.100
1905	0.101	0.084
1906	0.173 *	0.164
1907	0.166 *	0.231 *
1908	0.153 *	0.220 *
1909	0.079	0.196
1910	0.248 ***	0.159
1911	0.341 ***	0.202
1912	0.196 **	0.370 ***
1913	- 0.232 ***	0.071
1914	- 0.441 ***	0.335 ***
Region of recruitment / Military region		
Paris region	*Ref.*	*Ref.*
Region I	- 0.029	- 0.090
Region II	0.187 *	- 0.185
Region III	- 0.338 ***	- 0.266 **
Region IV	- 0.448 ***	- 0.046
Region V	- 0.021	0.167
Region VI	0.186 *	0.218
Region VII	0.272 ***	0.349 **
Region VIII	0.163 *	0.104
Region IX	0.058	0.094
Region X	- 0.182 *	-0.085
Region XI	0.109	0.297 **
Region XII	0.212 **	0.286 **
Region XIII	- 0.229 ***	0.111
Region XIV	0.070	0.062
Region XV	- 0.150 *	0.096
Region XVI	- 0.055	0.081
Region XVII	- 0.032	- 0.145
Region XVIII	- 0.047	- 0.077
Region XIX	-	-
Region XX	0.479 ***	0.129
Region XXI	0.029	0.097
Family background		
Born out of wedlock / placed in public care: No		
Both parents alive	*Ref.*	*Ref.*
Father alive, Mother deceased	- 0.133 ***	- 0.084
Father deceased, Mother alive	- 0.113 *	- 0.099
Both parents deceased	- 0.234 ***	- 0.189
Born out of wedlock / placed in public care: Yes	- 0.105	0.179
Height [in cm]		
< 155	- 1.267 ***	- 0.870 ***
155 - 160	- 0.420 ***	- 0.197 **
160 - 165	- 0.075 *	- 0.066
165 - 170	*Ref.*	*Ref.*
170 - 175	0.041	0.075
≥ 175	- 0.141 **	- 0.168 *
Missing information	- 1.214 ***	- 1.226 ***
Education level		
Cannot read or write	- 0.459 ***	- 0.490 ***
Can read	- 0.381 **	- 0.343
Can read and write	- 0.136 ***	- 0.175 ***
Can read, write and count	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	0.044	0.049

Holds the *Baccalauréat* or a higher degree	0.182	0.137
Missing information	- 0.386 ***	-0.348 ***
Economic sector / Occupation		
Agriculture, forestry, fishing		
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*
Farm worker, farm servant	0.028	- 0.206 *
Industry, craft		
Artisan, small-industry worker, factory/mine worker	0.022	- 0.162 ***
Unskilled labourer	- 0.057	- 0.058
Plant manager, industrial engineer, technician	- 0.204	- 0.291
Services		
Carter, driver, carrier, transport worker	0.325 ***	0.139
Merchant, trade employee	- 0.212 ***	- 0.388 ***
Bank employee, clerical employee	- 0.430 ***	- 0.796 ***
Civil servant, medical professional, teacher	- 0.241 *	- 0.366 **
Others	- 0.098	- 0.269 ***
Owner, annuitant, without occupation, student	- 0.305 ***	- 0.537 ***
Missing information	0.844 ***	0.426 **
Criminal record		
At least one conviction before the war	0.088	0.363 ***
Mean of the dependent variable	0.755	0.899
- 2 Log L	23,195.11	13,786.52
Number of observations	21,774	21,774

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Note: dependent variable in (1.1) = 1 if fit for armed service in August 1914 (0 otherwise)
                 in (1.2) = 1 if fit for armed service in August 1914 or subsequently (0 otherwise).
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.

Table 5
Civilian assignment: Estimated parameters of the logistic regressions

	(2.1)	(2.2)
Intercept	-1.927 ***	- 1.839 ***
Recruitment class		
1900	*Ref.*	*Ref.*
1901	0.067	- 0.022
1902	- 0.007	- 0.108
1903	0.003	- 0.051
1904	- 0.007	- 0.130
1905	- 0.084	- 0.166
1906	- 0.270 **	- 0.361 ***
1907	- 0.382 ***	- 0.467 ***
1908	- 0.471 ***	- 0.459 ***
1909	- 0.542 ***	- 0.626 ***
1910	- 1.036 ***	- 1.071 ***
1911	- 1.743 ***	- 1.707 ***
1912	- 1.916 ***	- 1.754 ***
1913	- 2.053 ***	- 2.151 ***
1914	- 2.570 ***	- 2.379 ***
Region of recruitment / Military region		
Paris region	*Ref.*	*Ref.*
Region I	0.415 ***	0.409 ***
Region II	0.160	0.163
Region III	- 0.503 ***	- 0.419 ***
Region IV	- 0.753 ***	- 0.585 ***
Region V	- 0.275 *	- 0.346 **
Region VI	0.275 *	- 0.244
Region VII	0.040	0.111
Region VIII	0.250 ***	0.230 **
Region IX	- 0.401 ***	- 0.429 ***
Region X	0.113	0.036
Region XI	- 0.047	- 0.091
Region XII	0.071	0.004
Region XIII	0.308 ***	0.394 ***
Region XIV	0.162	0.179
Region XV	0.125	0.115
Region XVI	0.314 **	0.242 **
Region XVII	- 0.153	- 0.038
Region XVIII	0.131	0.093
Region XIX	-	-
Region XX	- 0.569 ***	- 0.528 ***
Region XXI	0.267	0.217
Family background		
Born out of wedlock / placed in public care: No		
Both parents alive	*Ref.*	*Ref.*
Father alive, Mother deceased	0.003	- 0.017
Father deceased, Mother alive	-0.122	- 0.177 **
Both parents deceased	-0.256 *	- 0.134
Born out of wedlock / placed in public care: Yes	-0.060	-0.169
Height [in cm]		
< 155	- 0.084	- 0.155
155 - 160	- 0.015	- 0.089
160 - 165	- 0.023	- 0.018
165 - 170	*Ref.*	*Ref.*
170 - 175	0.023	- 0.029
≥ 175	0.002	- 0.001
Missing information	- 0.385 **	- 0.280 **
Education level		
Cannot read or write	- 0.626 ***	- 0.649 ***
Can read	0.287	0.146
Can read and write	- 0.166 **	- 0.167 **
Can read, write and count	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	- 0.200	- 0.148

Holds the *Baccalauréat* or a higher degree	- 0.055	0.004
Missing information	- 0.070	- 0.044
Economic sector / Occupation		
Agriculture, forestry, fishing		
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*
Farm worker, farm servant	0.655 ***	0.623 ***
Industry, craft		
Artisan, small-industry worker, factory/mine worker	1.076 ***	1.071 ***
Unskilled labourer	1.112 ***	1.166 ***
Plant manager, industrial engineer, technician	1.283 ***	1.283 ***
Services		
Carter, driver, carrier, transport worker	1.128 ***	1.064 ***
Merchant, trade employee	- 0.228	- 0.229 *
Bank employee, clerical employee	0.299	0.269
Civil servant, medical professional, teacher	1.272 ***	1.255 ***
Others	0.298 **	0.300 ***
Owner, annuitant, without occupation, student	0.107	0.045
Missing information	0.714 ***	0.607 ***
Criminal record		
At least one conviction before the war	- 0.169 *	- 0.170 *
Mean of the dependent variable	0.135	0.132
- 2 Log L	11,610.77	13,709.09
Number of observations	16,440	19,570

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample / (2.1): men considered fit for armed service in August 1914
        / (2.2): men considered fit for armed service in August 1914 or subsequently.
Note: dependent variable in (2.1) and (2.2) = 1 if assigned to a civilian position at one time or another
during the war (0 otherwise).
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.

Table 6
Infantry assignment: Estimated parameters of the logistic regressions

	(3.1)	(3.2)	(3.3)	(3.4)
Intercept	- 0.060	0.544 ***	-0.079	0.471 ***
Recruitment class				
1900	*Ref.*	*Ref.*	*Ref.*	*Ref.*
1901	0.073	0.102	0.101	0.151
1902	0.134	0.201 *	0.187 **	0.245 ***
1903	0.103	0.112	0.137	0.183 **
1904	0.260 ***	0.196 *	0.275 ***	0.251 ***
1905	0.065	- 0.009	0.036	0.006
1906	- 0.110	- 0.151	- 0.065	- 0.062
1907	0.084	0.014	0.069	0.067
1908	0.146	- 0.008	0.143 *	0.015
1909	0.207 **	0.041	0.158 *	0.072
1910	0.229 **	0.076	0.220 **	0.067
1911	0.201 **	0.073	0.173 **	0.053
1912	0.301 ***	0.267 ***	0.341 ***	0.289 ***
1913	0.025	0.064	0.134	0.172 *
1914	- 0.040	-0.071	0.220 ***	0.202 **
Region of recruitment / Military region				
Paris region	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Region I	0.199 **	0.018	0.310 ***	0.130
Region II	0.140	0.064	0.183 *	0.099
Region III	0.127	- 0.062	0.167 *	0.039
Region IV	0.248 **	- 0.000	0.237 **	0.062
Region V	0.034	- 0.016	0.078	0.025
Region VI	0.043	0.002	0.113	0.100
Region VII	- 0.097	0.005	- 0.082	0.046
Region VIII	0.262 ***	0.122	0.272 ***	0.173 *
Region IX	0.303 ***	- 0.003	0.274 ***	- 0.034
Region X	0.242 **	- 0.126	0.303 ***	- 0.003
Region XI	0.128	0.023	0.128 *	0.086
Region XII	0.436 ***	0.089	0.440 ***	0.111
Region XIII	0.073	0.223 **	0.154 **	0.256 ***
Region XIV	- 0.075	0.217 **	- 0.089	0.222 **
Region XV	- 0.241 ***	0.003	- 0.236 ***	0.083
Region XVI	- 0.152 *	0.014	- 0.087	0.035
Region XVII	0.309 ***	0.106	0.308 ***	0.104
Region XVIII	0.180 **	0.122	0.098	0.088
Region XIX	-	-	-	-
Region XX	- 0.796 ***	- 0.922 ***	- 0.825 ***	- 0.830 ***
Region XXI	0.039	- 0.031	- 0.019	0.085
Family background				
Born out of wedlock / placed in public care: No				
Both parents alive	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Father alive, Mother deceased	0.173 ***	0.227 ***	0.156 ***	0.198 ***
Father deceased, Mother alive	0.010	0.056	0.029	0.047
Both parents deceased	0.117	0.151	0.099	0.154
Born out of wedlock / placed in public care: Yes	- 0.147	0.062	- 0.076	0.078
Height [in cm]				
< 155	1.423 ***	1.981 ***	1.105 ***	1.335 ***
155 - 160	0.928 ***	1.561 ***	0.857 ***	1.344 ***
160 - 165	0.238 ***	0.368 ***	0.234 ***	0.350 ***
165 - 170	*Ref.*	*Ref.*	*Ref.*	*Ref.*
170 - 175	- 0.076	- 0.237 ***	- 0.071	- 0.213 ***
≥ 175	- 0.343 ***	- 0.620 ***	- 0.333 ***	- 0.578 ***
Missing information	0.429 ***	0.404 ***	0.422 ***	0.453 ***
Education level				
Cannot read or write	0.460 ***	0.795 ***	0.479 ***	0.695 ***
Can read	0.380 *	0.583 **	0.388 **	0.606 ***
Can read and write	0.245 ***	0.285 ***	0.207 ***	0.221 ***
Can read, write and count	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	0.345 ***	0.141	0.258 **	0.118

Holds the *Baccalauréat* or a higher degree	0.099	- 0.095	0.033	- 0.168
Missing information	- 0.033	- 0.007	- 0.039	- 0.015
Economic sector / Occupation				
Agriculture, forestry, fishing				
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Farm worker, farm servant	0.031	0.024	- 0.017	- 0.005
Industry, craft				
Artisan, small-industry worker, factory/mine worker	- 0.460 ***	- 0.601 ***	- 0.436 ***	- 0.562 ***
Unskilled labourer	0.140	0.491 ***	0.230 *	0.585 ***
Plant manager, industrial engineer, technician	- 0.431 **	- 0.751 ***	- 0.305	- 0.579 ***
Services				
Carter, driver, carrier, transport worker	- 0.646 ***	- 0.677 ***	- 0.637 ***	- 0.578 ***
Merchant, trade employee	- 0.015	- 0.013	0.021	0.043
Bank employee, clerical employee	0.094	0.127	0.095	0.102
Civil servant, medical professional, teacher	0.255 *	0.306 *	0.221 *	0.302 **
Others	0.077	0.028	0.035	- 0.039
Owner, annuitant, without occupation, student	- 0.449 ***	- 0.449 ***	- 0.453 ***	- 0.475 ***
Missing information	- 0.686 ***	- 0.449 ***	- 0.674 ***	- 0.465 ***
Criminal record				
At least one conviction before the war	- 0.109	0.551 ***	- 0.138 **	0.489 ***
Mean of the dependent variable	0.544	0.664	0.553	0.671
- 2 Log L	20,339.36	18,269.12	24,380.50	21,954.03
Number of observations	15,510	15,510	18,556	18,556

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample / (3.1) and (3.2): men considered fit for armed service in August 1914, who joined the war as soldiers
        / (3.3) and (3.4): men considered fit for armed service in August 1914 or subsequently, who joined the war as soldiers.
Note: dependent variable in (3.1) and (3.3) = 1 if initially assigned to a line infantry regiment (0 otherwise)
           in (3.2) and (3.4) = 1 if initially assigned to a line infantry regiment or to another infantry unit (0 otherwise).
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.

Table 7
War mortality: Estimated parameters of the logistic regressions

	(4.1)	(4.2)	(4.3)	(4.4)
Intercept	-1.273 ***	- 0.825 ***	- 1.374 ***	- 0.958 ***
Recruitment class				
1900	*Ref.*	*Ref.*	*Ref.*	*Ref.*
1901	0.043	0.007	0.046	0.006
1902	0.137	0.076	0.130	0.065
1903	0.060	0.016	0.067	0.016
1904	0.108	0.039	0.159	0.090
1905	0.208 *	0.202 *	0.228 **	0.222 **
1906	0.144	0.123	0.154	0.121
1907	0.397 ***	0.350 ***	0.429 ***	0.376 ***
1908	0.383 ***	0.330 ***	0.431 ***	0.385 ***
1909	0.458 ***	0.393 ***	0.487 ***	0.422 ***
1910	0.308 ***	0.190 *	0.330 ***	0.232 **
1911	0.598 ***	0.472 ***	0.594 ***	0.496 ***
1912	0.799 ***	0.643 ***	0.766 ***	0.639 ***
1913	0.626 ***	0.508 ***	0.618 ***	0.509 ***
1914	0.507 ***	0.416 ***	0.580 ***	0.470 ***
Region of recruitment / Military region				
Paris region	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Region I	- 0.164 *	- 0.142	- 0.106	- 0.103
Region II	0.080	0.125	0.146	0.188 *
Region III	0.155	0.199	0.198 *	0.229 **
Region IV	0.299 **	0.304 **	0.219 **	0.213 *
Region V	0.046	0.069	0.101	0.118
Region VI	0.172	0.206 *	0.198 *	0.207 *
Region VII	- 0.088	- 0.087	- 0.024	- 0.029
Region VIII	- 0.058	- 0.056	0.006	0.001
Region IX	- 0.003	0.012	- 0.014	0.017
Region X	0.020	0.130	0.126	0.204 *
Region XI	0.026	0.058	0.089	0.106
Region XII	- 0.088	- 0.047	- 0.068	- 0.036
Region XIII	- 0.109	- 0.158	- 0.128	- 0.165 *
Region XIV	- 0.052	- 0.080	0.019	- 0.009
Region XV	- 0.048	- 0.029	- 0.031	- 0.040
Region XVI	- 0.096	- 0.067	- 0.021	0.003
Region XVII	0.098	0.113	0.099	0.119
Region XVIII	- 0.064	- 0.065	0.011	0.007
Region XIX	-	-	-	-
Region XX	0.001	- 0.019	0.042	0.025
Region XXI	- 0.176	- 0.102	- 0.083	- 0.045
Family background				
Born out of wedlock / placed in public care: No				
Both parents alive	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Father alive, Mother deceased	0.079	0.037	0.090 *	0.059
Father deceased, Mother alive	0.038	0.020	0.042	0.023
Both parents deceased	0.213 **	0.194 *	0.106	0.082
Born out of wedlock / placed in public care: Yes	0.277 ***	0.288 ***	0.270 ***	0.271 ***
Height [in cm]				
< 155	0.566 ***	0.254 **	0.399 ***	0.146
155 - 160	0.231 ***	- 0.032	0.213 ***	- 0.024
160 - 165	0.077	- 0.004	0.082 *	0.003
165 - 170	*Ref.*	*Ref.*	*Ref.*	*Ref.*
170 - 175	- 0.113 **	- 0.051	- 0.103 **	- 0.048
≥ 175	- 0.132 *	0.055	- 0.103	0.070
Missing information	0.064	- 0.125	0.045	- 0.139
Education level				
Cannot read or write	0.189	0.043	0.139	0.019
Can read	- 0.092	- 0.190	0.002	- 0.090
Can read and write	0.034	- 0.032	0.023	- 0.022
Can read, write and count	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	- 0.037	- 0.142	- 0.105	- 0.198

Holds the *Baccalauréat* or a higher degree	0.172	0.125	0.135	0.109
Missing information	- 0.135 **	- 0.155 **	- 0.174 ***	- 0.191 ***
Economic sector / Occupation				
Agriculture, forestry, fishing				
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Farm worker, farm servant	- 0.136	- 0.107	- 0.105	- 0.077
Industry, craft				
Artisan, small-industry worker, factory/mine worker	- 0.361 ***	- 0.226 ***	- 0.335 ***	- 0.210 ***
Unskilled labourer	- 0.162	- 0.249 *	- 0.161	- 0.249 *
Plant manager, industrial engineer, technician	- 0.604 **	- 0.518 *	- 0.527 **	- 0.478 *
Services				
Carter, driver, carrier, transport worker	- 0.291 ***	- 0.081	- 0.237 **	- 0.060
Merchant, trade employee	- 0.216 ***	- 0.249 ***	- 0.201 ***	- 0.255 ***
Bank employee, clerical employee	- 0.251 *	- 0.327 **	- 0.311 **	- 0.394 ***
Civil servant, medical professional, teacher	- 0.365 **	- 0.352 **	- 0.329 **	- 0.337 **
Others	- 0.118	- 0.123	- 0.130 *	- 0.129 *
Owner, annuitant, without occupation, student	- 0.316 **	- 0.285 **	- 0.304 ***	- 0.291 **
Missing information	- 0.372 **	- 0.321 **	- 0.223 *	- 0.185
Criminal record				
At least one conviction before the war	0.054	- 0.084	- 0.006	- 0.123
Initial assignment				
Military assignment				
Line Infantry	-	*Ref.*	-	*Ref.*
Territorial Infantry	-	- 1.488 ***	-	- 1.324 ***
Chasseurs	-	0.134	-	0.125
Infantry from French African possessions	-	0.023	-	0.053
Colonial Infantry / Colonial Battalions	-	0.198 **	-	0.269 ***
Cavalry	-	- 0.954 ***	-	- 0.935 ***
Artillery	-	- 1.461 ***	-	- 1.452 ***
Engineering	-	- 1.068 ***	-	- 1.136 ***
Logistics	-	- 1.793 ***	-	- 1.781 ***
Supply	-	- 0.770 ***	-	- 0.819 ***
Medical corps	-	- 1.268 ***	-	- 1.192 ***
Others	-	- 1.268 ***	-	- 1.225 ***
Civilian assignment	-	- 1.589 ***	-	- 1.552 ***
Missing information	-	- 0.273	-	- 0.264
Initial rank				
Private 2nd class soldier (or Missing information)	-	*Ref.*	-	*Ref.*
Private 1st class soldier	-	- 0.066	-	0.008
Corporal / *Brigadier*	-	- 0.023	-	0.044
Sergeant / *Maréchal des logis* / Warrant officer / *Aspirant*	-	0.179 **	-	0.253 ***
Second Lieutenant	-	0.573 **	-	0.646 ***
Lieutenant / Captain	-	0.243	-	0.391
Mean of the dependent variable	0.252	0.252	0.245	0.245
- 2 Log L	18,224.87	17,205.84	21,418.99	20,276.42
Number of observations	16,440	16,440	19,570	19,570

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample / (4.1) and (4.2): men considered fit for armed service in August 1914
/ (4.3) and (4.4): men considered fit for armed service in August 1914 or subsequently.
Note: dependent variable in (4.1) to (4.4) = 1 if died during the war period (August 1914 - October 1919) (0 otherwise).
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.

Table 8
War mortality: Estimated parameters of the Cox regression models

	(5.1)	(5.2)	(5.3)	(5.4)
Recruitment class				
1900	*Ref.*	*Ref.*	*Ref.*	*Ref.*
1901	0.044	0.012	0.044	0.008
1902	0.122	0.069	0.117	0.060
1903	0.054	0.011	0.061	0.010
1904	0.101	0.034	0.143	0.073
1905	0.187 **	0.177 *	0.203 **	0.194 **
1906	0.125	0.098	0.133	0.094
1907	0.346 ***	0.292 ***	0.374 ***	0.313 ***
1908	0.356 ***	0.304 ***	0.392 ***	0.341 ***
1909	0.409 ***	0.343 ***	0.434 ***	0.364 ***
1910	0.293 ***	0.188 *	0.310 ***	0.220 **
1911	0.518 ***	0.392 ***	0.520 ***	0.419 ***
1912	0.712 ***	0.564 ***	0.686 ***	0.565 ***
1913	0.566 ***	0.458 ***	0.551 ***	0.447 ***
1914	0.413 ***	0.305 ***	0.475 ***	0.350 ***
Region of recruitment / Military region				
Paris region	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Region I	- 0.150 *	- 0.129	- 0.101	- 0.100
Region II	0.066	0.105	0.120	0.151
Region III	0.134	0.172	0.165 *	0.184 **
Region IV	0.230 **	0.215 **	0.161 *	0.141
Region V	0.037	0.053	0.083	0.092
Region VI	0.150	0.182 *	0.170 *	0.176 *
Region VII	- 0.092	- 0.088	- 0.035	- 0.040
Region VIII	- 0.064	- 0.067	- 0.009	- 0.021
Region IX	- 0.011	0.001	- 0.021	0.005
Region X	0.011	0.101	0.096	0.155 *
Region XI	0.011	0.037	0.063	0.075
Region XII	- 0.076	- 0.038	- 0.062	- 0.033
Region XIII	- 0.092	- 0.134	- 0.115	- 0.147 *
Region XIV	- 0.046	- 0.067	0.015	- 0.012
Region XV	- 0.042	- 0.031	- 0.032	- 0.046
Region XVI	- 0.100	- 0.071	- 0.040	- 0.018
Region XVII	0.081	0.101	0.084	0.105
Region XVIII	- 0.070	- 0.074	- 0.011	- 0.018
Region XIX	-	-	-	-
Region XX	- 0.001	- 0.024	0.036	0.011
Region XXI	- 0.179	- 0.113	- 0.098	- 0.066
Family background				
Born out of wedlock / placed in public care: No				
Both parents alive	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Father alive, Mother deceased	0.072	0.036	0.079 *	0.051
Father deceased, Mother alive	0.029	0.012	0.031	0.011
Both parents deceased	0.165 *	0.143 *	0.082	0.059
Born out of wedlock / placed in public care: Yes	0.216 ***	0.220 ***	0.211 ***	0.206 ***
Height [in cm]				
< 155	0.482 ***	0.209 **	0.322 ***	0.101
155 - 160	0.205 ***	- 0.023	0.183 ***	- 0.024
160 - 165	0.071	0.001	0.074 *	0.004
165 - 170	*Ref.*	*Ref.*	*Ref.*	*Ref.*
170 - 175	- 0.099 **	- 0.043	- 0.091 **	- 0.043
≥ 175	- 0.109	0.053	- 0.089	0.057
Missing information	0.073	- 0.096	0.042	- 0.124
Education level				
Cannot read or write	0.141	0.024	0.110	0.015
Can read	- 0.086	- 0.173	- 0.007	- 0.087
Can read and write	0.022	- 0.036	0.013	- 0.026
Can read, write and count	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	- 0.031	- 0.130	- 0.091	- 0.182
Holds the *Baccalauréat* or a higher degree	0.145	0.082	0.115	0.073

Missing information	- 0.118 **	- 0.124 **	- 0.154 ***	- 0.158 ***
Economic sector / Occupation				
Agriculture, forestry, fishing				
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Farm worker, farm servant	- 0.117	- 0.083	- 0.089	- 0.055
Industry, craft				
Artisan, small-industry worker, factory/mine worker	- 0.311 ***	- 0.183 ***	- 0.291 ***	- 0.175 ***
Unskilled labourer	- 0.125	- 0.201 *	- 0.129	- 0.207 *
Plant manager, industrial engineer, technician	- 0.518 **	- 0.424 *	- 0.455 **	- 0.400 *
Services				
Carter, driver, carrier, transport worker	- 0.257 ***	- 0.067	- 0.208 **	- 0.047
Merchant, trade employee	- 0.188 ***	- 0.212 ***	- 0.175 ***	- 0.221 ***
Bank employee, clerical employee	- 0.208 *	- 0.255 **	- 0.264 **	- 0.322 ***
Civil servant, medical professional, teacher	- 0.312 **	- 0.291 **	- 0.285 **	- 0.285 **
Others	- 0.093	- 0.100	- 0.102	- 0.104 *
Owner, annuitant, without occupation, student	- 0.284 ***	- 0.249 **	- 0.272 ***	- 0.253 **
Missing information	- 0.326 **	- 0.267 **	- 0.198 *	- 0.156
Criminal record				
At least one conviction before the war	0.043	- 0.078	- 0.006	- 0.109
Initial assignment				
Military assignment				
Line Infantry	-	*Ref.*	-	*Ref.*
Territorial Infantry	-	- 1.384 ***	-	- 1.242 ***
Chasseurs	-	0.120 *	-	0.120 *
Infantry from French African possessions	-	0.002	-	0.037
Colonial Infantry / Colonial Battalions	-	0.158 **	-	0.210 ***
Cavalry	-	- 0.869 ***	-	- 0.855 ***
Artillery	-	- 1.338 ***	-	- 1.333 ***
Engineering	-	- 0.977 ***	-	- 1.041 ***
Logistics	-	- 1.658 ***	-	- 1.654 ***
Supply	-	- 0.736 ***	-	- 0.777 ***
Medical corps	-	- 1.178 ***	-	- 1.112 ***
Others	-	- 1.176 ***	-	- 1.141 ***
Civilian assignment	-	- 1.469 ***	-	- 1.440 ***
Missing information	-	- 0.227	-	- 0.218
Initial rank				
Private 2nd class soldier (or Missing information)	-	*Ref.*	-	*Ref.*
Private 1st class soldier	-	- 0.057	-	0.015
Corporal / *Brigadier*	-	- 0.027	-	0.041
Sergeant / *Maréchal des logis* / Warrant officer / *Aspirant*	-	0.148 **	-	0.223 ***
Second Lieutenant	-	0.551 ***	-	0.625 ***
Lieutenant / Captain	-	0.281	-	0.404 *
- 2 Log L	79,045.22	77,954.42	93,155.92	91,935.68
Number of observations				
Uncensored	4,149	4,149	4,798	4,798
Censored	12,291	12,291	14,772	14772
Total	16,440	16,440	19,570	19,570

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).

Subsample / (4.1) and (4.2): men considered fit for armed service in August 1914

/ (4.3) and (4.4): men considered fit for armed service in August 1914 or subsequently.

Note: dependent variable in (4.1) to (4.4) = survival time in days, measured from August 2, 1914 (right censored in October 24, 1919).

The estimated coefficients represent the effects of explanatory variables on the log of the hazard rate of death.

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.

Table 9
War mortality: Estimated parameters of the piecewise constant hazard rate models

	(6.1)	(6.2)	(6.3)	(6.4)
Intercept	- 3.069 ***	- 3.692 ***	- 3.280 ***	- 4.556 ***
Recruitment class				
1900	*Ref.*	*Ref.*	*Ref.*	*Ref.*
1901	0.070	0.108	0.052	0.037
1902	0.193	0.171	0.139	0.087
1903	0.098	0.097	0.083	0.034
1904	0.172	0.138	0.186 *	0.103
1905	0.265 *	0.255	0.235 **	0.180
1906	0.185	0.166	0.160	0.062
1907	0.495 ***	0.468 ***	0.434 ***	0.363 ***
1908	0.616 ***	0.620 ***	0.491 ***	0.483 ***
1909	0.668 ***	0.649 ***	0.518 ***	0.482 ***
1910	0.554 ***	0.433 ***	0.419 ***	0.296 **
1911	0.812 ***	0.743 ***	0.645 ***	0.542 ***
1912	1.216 ***	1.086 ***	0.882 ***	0.792 ***
1913	0.983 ***	0.919 ***	0.707 ***	0.645 ***
1914	0.447 ***	0.171	0.511 ***	0.243 **
Region of recruitment / Military region				
Paris region	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Region I	- 0.263 **	- 0.278 **	- 0.157	- 0.195 *
Region II	0.080	0.198	0.131	0.184
Region III	0.287 *	0.375 **	0.204 *	0.295 **
Region IV	0.289 *	0.364 **	0.182	0.215
Region V	- 0.025	- 0.074	0.070	- 0.013
Region VI	0.230	0.279	0.200 *	0.241 *
Region VII	- 0.204	- 0.276 *	- 0.064	- 0.163
Region VIII	- 0.200	- 0.324 **	- 0.067	- 0.207 *
Region IX	- 0.037	- 0.077	- 0.025	- 0.065
Region X	- 0.080	0.024	0.060	0.134
Region XI	- 0.055	- 0.065	0.037	- 0.004
Region XII	- 0.127	- 0.118	- 0.087	- 0.145
Region XIII	- 0.118	- 0.159	- 0.143	- 0.209 *
Region XIV	- 0.059	- 0.130	0.007	- 0.069
Region XV	- 0.062	0.002	- 0.055	- 0.068
Region XVI	- 0.183	- 0.160	- 0.074	- 0.096
Region XVII	0.169	0.157	0.101	0.095
Region XVIII	- 0.205	- 0.287 *	- 0.062	- 0.175
Region XIX	-	-	-	-
Region XX	- 0.052	- 0.025	0.020	- 0.058
Region XXI	- 0.361	- 0.493	- 0.129	- 0.203
Family background				
Born out of wedlock / placed in public care: No				
Both parents alive	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Father alive, Mother deceased	0.140 *	0.085	0.110 **	0.096
Father deceased, Mother alive	0.027	0.007	0.027	0.022
Both parents deceased	0.200	0.097	0.101	0.026
Born out of wedlock / placed in public care: Yes	0.331 **	0.437 ***	0.250 **	0.338 ***
Height [in cm]				
< 155	0.810 ***	0.421 **	0.386 ***	0.164
155 - 160	0.385 ***	0.021	0.246 ***	- 0.012
160 - 165	0.124 *	0.002	0.100 **	0.011
165 - 170	*Ref.*	*Ref.*	*Ref.*	*Ref.*
170 - 175	- 0.123 *	0.014	- 0.102 *	- 0.006
≥ 175	- 0.151	0.135	- 0.096	0.161 *
Missing information	0.087	- 0.143	0.019	- 0.135
Education level				
Cannot read or write	0.248	- 0.005	0.139	0.001
Can read	- 0.121	- 0.145	- 0.028	- 0.032
Can read and write	0.013	- 0.081	0.003	- 0.059
Can read, write and count	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Holds the *Brevet de l'enseignement primaire*	- 0.073	- 0.200	- 0.113	- 0.219

Holds the *Baccalauréat* or a higher degree	0.064	- 0.137	0.099	- 0.094
Missing information	- 0.128	- 0.162 *	- 0.168 ***	- 0.163 **
Economic sector / Occupation				
Agriculture, forestry, fishing				
Farmer (incl. winemaker), lumberjack, fisherman	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Farm worker, farm servant	- 0.207 *	- 0.144	- 0.123	- 0.073
Industry, craft				
Artisan, small-industry worker, factory/mine worker	- 0.476 ***	- 0.231 ***	- 0.367 ***	- 0.177 ***
Unskilled labourer	- 0.192	- 0.264	- 0.192	- 0.256
Plant manager, industrial engineer, technician	- 0.641 *	- 0.437	- 0.503 **	- 0.330
Services				
Carter, driver, carrier, transport worker	- 0.473 ***	- 0.271 *	- 0.278 ***	- 0.120
Merchant, trade employee	- 0.305 ***	- 0.341 ***	- 0.219 **	- 0.277 ***
Bank employee, clerical employee	- 0.328 *	- 0.474 **	- 0.318 **	- 0.437 ***
Civil servant, medical professional, teacher	- 0.463 **	- 0.489 **	- 0.339 **	- 0.389 **
Others	- 0.131	- 0.079	- 0.106	- 0.061
Owner, annuitant, without occupation, student	- 0.354 **	- 0.477 **	- 0.309 **	- 0.358 **
Missing information	- 0.523 ***	- 0.590 ***	- 0.275 *	- 0.357 **
Criminal record				
At least one conviction before the war	0.052	- 0.108	- 0.019	- 0.167 *
Fitness status / Assignment (in quarter *t*)				
Deferred / Discharged / Exempted	-	*Ref.*	-	*Ref.*
Fit for auxiliary service	-	- 1.886 ***	-	- 1.303 ***
Fit for armed service				
Civilian assignment	-	- 2.188 ***	-	- 1.122 ***
Military assignment				
Line Infantry	-	1.125 ***	-	1.948 ***
Territorial Infantry	-	- 1.854 ***	-	- 0.735
Chasseurs	-	1.417 ***	-	2.193 ***
Infantry from French African possessions	-	0.934 ***	-	1.809 ***
Colonial Infantry / Colonial Battalions	-	1.348 ***	-	2.178 ***
Cavalry	-	- 0.960 ***	-	0.092
Artillery	-	- 1.239 ***	-	- 0.130
Engineering	-	- 0.521 ***	-	0.451 ***
Logistics	-	- 2.259 ***	-	- 1.054 ***
Supply	-	- 1.814 ***	-	- 0.875 **
Medical corps	-	- 1.803 ***	-	- 0.666 **
Others	-	- 1.397 ***	-	- 0.289
Missing information	-	0.123	-	1.067 ***
Rank (in quarter *t*)				
Private 2nd class soldier	-	*Ref.*	-	*Ref.*
Private 1st class soldier	-	- 0.022	-	0.003
Corporal / *Brigadier*	-	0.173 **	-	0.168 **
Sergeant / *Maréchal des logis*	-	0.248 **	-	0.221 ***
Warrant officer / *Aspirant*	-	0.795 ***	-	0.654 ***
Second Lieutenant	-	1.032 ***	-	0.933 ***
Lieutenant	-	0.948 ***	-	0.793 ***
Captain (or higher rank)	-	1.241 **	-	0.859 **
Missing information	-	2.034 ***	-	1.917 ***
Quarter				
1914 – Q3	*Ref.*	*Ref.*	*Ref.*	*Ref.*
1914 – Q4	- 0.330 ***	- 0.186 ***	- 0.467 ***	- 0.304 ***
1915 – Q1	- 0.738 ***	- 0.536 ***	- 0.877 ***	- 0.825 ***
1915 – Q2	- 0.371 ***	- 0.100	- 0.477 ***	- 0.347 ***
1915 – Q3	- 0.634 ***	- 0.275 ***	- 0.629 ***	- 0.406 ***
1915 – Q4	- 1.186 ***	- 0.778 ***	- 1.261 ***	- 0.974 ***
1916 – Q1	- 1.165 ***	- 0.714 ***	- 1.276 ***	- 0.929 ***
1916 – Q2	- 0.765 ***	- 0.268 **	- 0.923 ***	- 0.515 ***
1916 – Q3	- 0.588 ***	- 0.034	- 0.780 ***	- 0.308 ***
1916 – Q4	- 0.985 ***	- 0.383 ***	- 1.274 ***	- 0.745 ***
1917 – Q1	- 2.067 ***	- 1.446 ***	- 2.259 ***	- 1.702 ***
1917 – Q2	- 0.765 ***	- 0.122	- 1.004 ***	- 0.430 ***
1917 – Q3	- 1.193 ***	- 0.514 ***	- 1.458 ***	- 0.846 ***
1917 – Q4	- 1.769 ***	- 1.059 ***	- 2.127 ***	- 1.472 ***
1918 – Q1	- 1.788 ***	- 1.058 ***	- 2.117 ***	- 1.433 ***
1918 – Q2	- 0.787 ***	- 0.044	- 1.094 ***	- 0.383 ***

1918 – Q3	- 0.354	0.424 ***	- 0.725 ***	0.035
1918 – Q4	- 0.538 **	0.287 *	- 0.948 ***	- 0.130
Heterogeneity variance	3.674 ***	4.520 ***	1.499 *	2.999 ***
Log L	- 19,437.83	- 18,426.56	- 22,905.36	- 21,481.70
Number of observations (individuals*quarters)	248,617	248,617	299,476	299,476

Source: military registers – sample of conscripts of classes 1900 to 1914 (Author's data collection and computations).
Subsample / (4.1) and (4.2): men considered fit for armed service in August 1914
/ (4.3) and (4.4): men considered fit for armed service in August 1914 or subsequently.
Note: dependent variable in (4.1) to (4.4) = 1 if died during quarter t (0 otherwise).
The estimated coefficients represent the effects of explanatory variables on the log of the hazard rate of death.
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; *Ref.*: reference category.