

Did statutory insurance improve the welfare of Swedish workers? The statutory workplace accident insurance act of 1916

Lars-Fredrik Andersson ^a, Liselotte Eriksson ^b and Bernard Harris ^c

^aEconomic History, CEDAR, Umeå University, Umeå, Sweden; ^bCEDAR, UCGS, Umeå University, Umeå; ^cSocial Work and Social Policy, University of Strathclyde, Glasgow, UK

ABSTRACT

Welfare researchers have regarded statutory accident insurance in 1916 as a starting point for the exceptional expansion of the Swedish welfare state. However, rather less attention has been paid to the roles played by mutual insurance societies and employer compensation schemes in offering voluntary welfare protection. We argue that voluntary welfare protection was an integral part of the early-twentieth century welfare system and played a crucial role in protecting workers in the case of sickness and accident. We also examine the limitations of these arrangements and explore the ways in which the design of the statutory scheme ensured that there was a continuing role for voluntary provision after the new Act came into operation. We also explore the impact of the scheme on wage levels, and show how its introduction eroded the wage premiums which had previously been earned by workers in high-risk industries.

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During the late-nineteenth and early-twentieth centuries, there was an increasing awareness of the importance of workplace accidents and the need to provide accident insurance for those threatened by them. This led to the introduction of accident insurance and workers' compensation laws in several countries, including Germany (1884), Austria (1887), Czechoslovakia (1888), Norway (1894), Finland (1895), and the United Kingdom (1897).¹ The introduction of these laws has been regarded as a foundational moment in the emergence of modern 'welfare' or 'social' states (Fishback & Kantor, 2000; Moses, 2018, pp. 4–5).

In Sweden, as elsewhere, the initial response to the growth (and growing awareness) of workplace hazards was reflected in the development of health insurance societies, together with the emergence of collective agreements. In 1891, the Government introduced a national registration scheme and furnished health insurance societies with a small subsidy to defray registration costs but the first major legislative innovation was the Employers' Liability Act of 1901, which gave employers the option of enrolling workers in either private insurance companies or a public insurance agency (*Riksförsäkringsanstalten*). This Act was followed by further Acts in 1910 and 1916. The second of these Acts reduced waiting times, extended coverage to new groups of workers, and introduced the principle of compulsion into accident insurance.

Compensation for work-related accidents was the type of social insurance which developed earliest internationally. Edebalk (2000) argued that when Sweden introduced workers' compensation in 1901, most other countries had already progressed much further. He further argued that Sweden was not only very late in this respect, but that the system adopted was one of the worst found

(Edebalk, 1996). When the 1901 Act was introduced, particular criticism was directed towards the long waiting period for which no compensation was provided. He argued that this might have been defensible if there had been an effective sickness insurance system for workers to rely on, but 'the only system found was a highly un-developed and ill-coordinated set of voluntary health insurance societies' (Edebalk, 2000, p. 544).

In contrast to the 1901 Act, the promulgation of the 1916 Act has been regarded as a transformational moment in the history of Swedish accident insurance. P. G. Edebalk (1993, p. 113) argued that this Act moved Sweden 'from the bottom to the top' of an international league table of countries providing statutory accident insurance. However, although he acknowledged the existence of voluntary arrangements, he did not investigate them in any detail and said relatively little about the ways in which they continued to operate after the 1916 Act was implemented.

This paper aims to bridge this gap by considering both voluntary and statutory contributions to workers' welfare. Section 1 illustrates the increased demand for accident insurance in Sweden between ca. 1885 and 1917. Section 2 explores voluntary responses to workplace accident risk by outlining the development of mutual health insurance societies and employers' welfare arrangements. Section 3 discusses the growth of statutory provision between 1891 and 1916. Section 4 explores the extent to which the introduction of statutory accident insurance represented an overall increase in the level of protection offered to the employed workforce. Section 5 examines the extent to which the expansion of statutory insurance affected workers' self-insurance capabilities by reducing the income available for voluntary savings. Section 6 concludes.

The paper reflects a growing interest in the development of 'non-state' welfare in the historiography of the Swedish welfare state. Andersson and Eriksson (2019) have discussed the exclusion of women from late-nineteenth and early-twentieth century mutual health insurance schemes and the different ways in which these schemes sought to manage sickness risks. Jansson and Ottosson (2021) have also examined the growth of occupational welfare schemes in Sweden during the 1970s. However, although they recognized that 'from a historical perspective, there is nothing new about social protection being provided by actors other than the state' (p. 319), their paper was primarily concerned with employment protection and they paid relatively little attention to the development of either occupational welfare or other forms of voluntary social provision in earlier periods.

From an international perspective, the history of accident insurance has been studied in relation to a number of different countries. During the 1920s, Knowles (1920) examined the legal foundations of workers' compensation and accident insurance in more than thirty different countries and the International Labour Office (International Labour Office, 1925) compiled a comprehensive survey of such provisions in all parts of the world outside the United States. However, the ILO report on the Swedish case appears to have focused on the initial proposal, rather than the final legislation.² Fishback and Kantor (2000); 1992, 1995, Fishback & Kantor (1996), 1998) have analysed the development of accident insurance in the United States from an economic perspective and Moses (2018) has examined the comparative history of its development in Germany, Italy and the United Kingdom. Flora and Alber (1983, pp. 51–55) placed the development of accident insurance at the heart of their account of the early development of welfare states in twelve western European countries, and Huberman and Lewchuk (2003) used it to illustrate the relationship between social reform and European economic integration. Lehmann-Hasemeyer and Streb (2008) have explored the extent to which German workers 'paid' for the introduction of statutory accident insurance with reductions in net wages.

The history of accident insurance also forms part of the larger history of health (or sickness) insurance. In the case of the USA, both Murray (2007) and Emery (2010) attributed the absence of a statutory health insurance scheme to the strength and vitality of existing voluntary arrangements. In the United Kingdom, a number of authors have argued that the introduction of statutory health insurance, as part of the National Insurance Act of 1911, undermined the mutualist ethos of the

existing friendly societies and led, ultimately, to their (near) demise (see e.g. Green, 1993; Penn, 2011). However, Harris (2018) has argued that the statutory scheme developed in response to the perceived defects of the existing schemes and that they continued to grow alongside it for the next thirty years.

This paper contributes to this literature in a variety of ways. In the first place, it highlights both the importance and the variety of the voluntary arrangements which developed in Sweden during the second half of the nineteenth century, together with their limitations. It also shows how these schemes were related to the development of the statutory accident insurance scheme and developed alongside it after it was introduced. The persistence and even growth of these schemes after 1918 demonstrates that the advent of statutory provision did not result in the 'crowding out' of voluntary alternatives. We also examine the extent to which the introduction of statutory insurance affected workers' wage levels. We find little evidence to show that the new scheme led to a *general* reduction in wage levels but it does appear to have affected the value of the wages paid to workers in 'high-risk' industries. This meant that the 'wage premium' which such workers had enjoyed before 1918 was largely reversed.

1. Workers' exposure to workplace accidents over time

With industrialization and the increased reliance on wage work, workers became increasingly vulnerable to workplace accidents and the inability to work. The increased number of industrial workers in hazardous working environments lacking social safety nets triggered the political debate.

The proportion of workers who derived their living from agriculture declined as the proportion of workers employed in non-agricultural sectors increased. There were also major changes in the structure of the non-agricultural workforce, with an increasing proportion of workers being employed in manufacturing industry (Schön & Krantz, 2012). Many of these new occupations were associated with mechanization and new work practices which contributed to a significant increase in the incidence of workplace accidents (Aldrich, 1997; Fishback & Kantor, 1998; Lewchuk, 1991).

Between 1885 and 1917, Swedish employers compiled a series of returns showing the total number of workplace accidents (i.e. not merely accidents experienced by insured workers or workers submitting insurance claims) resulting in absences of three days or more among workers who were employed in manufacturing industry, transport and construction, and parts of the service sector. The initial return distinguished between accidents which resulted in absences of 3–15 days, 16–59 days, and ≥ 60 days, whereas the later reports distinguished between accidents resulting in absences of 3–15 days, 16–60 days and ≥ 61 days. These returns showed, firstly, that there was a general increase in the average risk, from a frequency of 1.8 accidents per 100 workers in 1885/6 to 4.3 accidents per 100 workers in 1917; and, secondly, that there was an emerging gap in accident frequency rates over the period. Whilst workers in the lower tail (p5) of the accident risk distribution experienced less than one accident per hundred workers per year, workers in the upper tail (p95) experienced 3.5 accidents per hundred workers in 1885/6 and 13.7 in 1917 (see Figure 1).

Although accident rates rose overall, the majority of 'new' accidents resulted in relatively short absence periods. Table 1 shows that 37.5 per cent of accidents in 1885/6 resulted in absence periods of between three and fifteen days, and 40.8 per cent of accidents resulted in absence periods of 16–59 days. Serious workplace accidents, resulting in long-term absence or invalidity, accounted for ten per cent of all accidents and three per cent of accidents resulted in death. By 1917, the proportion of accidents resulting in short-term absence periods had increased to 44 per cent, while the proportion of accidents resulting in either long-term invalidity or death had declined to less than six per cent. When decomposing the

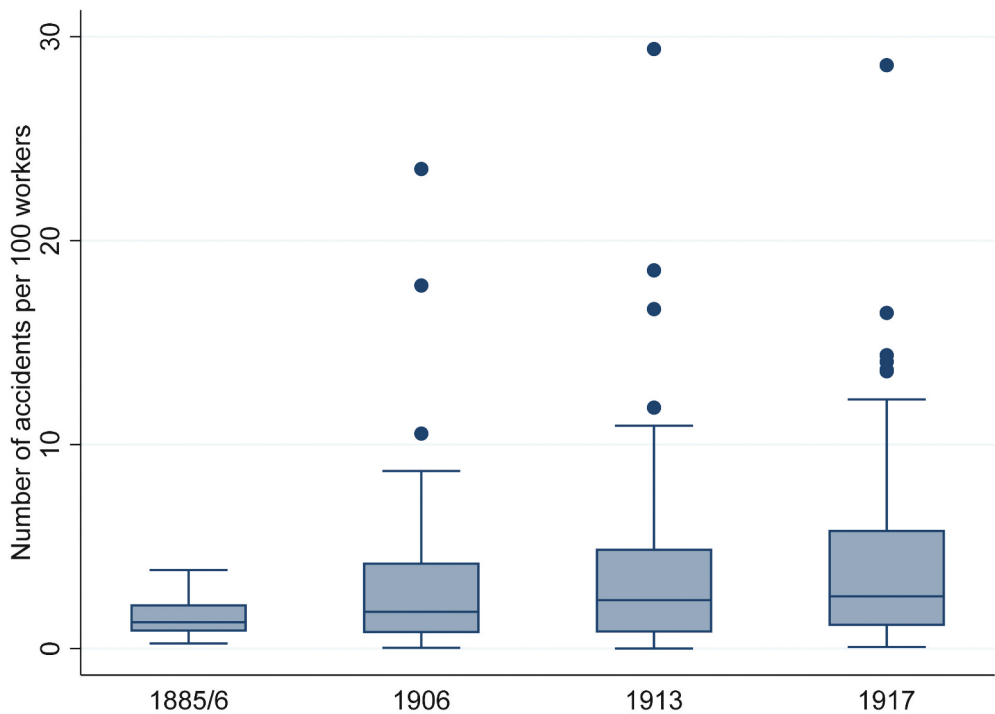


Figure 1. Accident frequency per 100 workers across manufacturing industries, building, transport and service sector, 1885/6, 1906, 1913 and 1917.

Note: Only accidents resulting in absences of three days or more are included. Employers in manufacturing industries, building, transport and service sector were legally required to report on accidents from 1906 onwards. The first benchmark (1885/6) was a specific inquiry by the Workers' Insurance Committee, under which employers were required to report accidents for the second half of 1885 and first half year of 1886.

Source: Arbetareförsäkringskommittén 1888; Kommerskollegie 1908; Socialstyrelsen (1916); Riksförsäkringsanstalten (1921, 1922).

Table 1. Accident frequency by duration of workdays lost in per cent, 1885, 1906, 1913 and 1917.

Year	3–15 days	16–59/60 days	>/≥60 days	Invalidity	Death	Total
Panel A – Per cent share						
1885	37.5	40.8	8.2	10.3	3.3	100.0
1906	40.1	41.9	7.2	8.1	3.2	100.0
1913	42.5	44.4	5.0	6.5	1.2	100.0
1917	44.0	44.7	5.4	4.4	1.2	100.0
Panel B – Frequency per 1000 workers						
1885	6.9	7.5	1.5	1.9	0.6	18.4
1906	8.9	9.3	1.6	1.8	0.7	22.2
1913	13.7	14.3	1.6	2.1	0.4	32.2
1917	18.8	19.1	2.3	1.9	0.5	42.7

Note: * Invalidity denotes a permanent loss of working capacity in the range between >0 and ≤100%.

Sources: See Figure 1.

growth in average risk between 1885/6 and 1917, we find that 49 per cent of the increase was due to accidents which resulted in absence periods of 3–15 days, and 48 per cent was caused by accidents which resulted in 16–59/60 days' sick leave.

The increase in average occupational risk and the increase in the number of workers facing short-term absences encouraged many workers to seek voluntary protection in mutual health insurance societies and generated new demands for employers to take responsibility for workplace accidents through union agreements. Politicians also argued for the obligation of employers to compensate workers in the case of workplace accidents.

2. Voluntary responses to occupational risk

As Jansson and Ottosson (2021, p. 319) have argued, social protection has often been provided by actors other than the state and 'protection from risks and costs associated with unemployment, sickness, workplace accidents, pensions and one's own funeral was often an important function of trade union and other occupational associations, such as guilds, before the advent of the modern welfare state'. Employers provided support, either on the basis of old laws, such as those covering relations between masters and servants, or voluntarily. Workers also gathered in mutual health insurance societies to support each other in the case of accident, sickness or death. Finally, the right to establish associations enabled workers to form labor unions and put pressure on employers to support workers in the case of workplace accidents, prior to the introduction of statutory insurance.

Before the industrial breakthrough and statutory insurance, laws from the nineteenth century obliged employers in mining, shipping and those that employed servants to provide for their employees in the case of sickness and workplace accidents. Swedish mine-owners (such as the owners of the Falun copper mine, in the southern half of the country) had already begun to follow German precedents during the eighteenth century by organizing welfare funds. Many iron foundries, such as Olofsfors bruk in northern Sweden, also provided medical assistance and support in the event of sickness or workplace accidents to workers and their families. However, these laws only offered detailed protection to specified groups of workers, including blacksmiths in mining, sailors, 'worthy' or 'deserving' servants over the age of 30, and railway workers.³ They were also paternalistic, arbitrary and contingent on the goodwill of the employer, where protection for workers could be restricted to a minimum. With the industrial breakthrough, new industrial principles of organizing work additionally made the old laws insufficient in compelling employers to support workers in the case of workplace accidents.

Many employers also provided financial support through compulsory workplace health insurance societies. Membership was usually mandatory for the majority of workers at these workplaces (Lindeberg, 1949).⁴ However, compulsory health insurance societies established and run by the employer became increasingly unpopular. Employers selected the board and the fund's physician and had an interest in reducing sickness periods, which did not always benefit the workers (Andersson & Eriksson, 2017). Workers further lost the right to benefits and contributions made if they left the workplace; this only changed with the Health Insurance Act of 1910, which came to encourage the establishment of voluntary national health insurance societies (Johansson, 2003).

The 1910 Act also had an effect on the organization and development of mutual health insurance schemes. These owed their beginnings to the Trade Decree of 1864 which enabled workers' associations to conduct economic business. Most of the early societies were small and local, with no more than 50 or 100 members. Actuarial principles were uncommon, premiums were collected *ex ante* and all members were priced equally, regardless of the risks they faced (Andersson & Eriksson, 2017). The new Act sought to increase the level of risk diversification by encouraging a process of consolidation. The larger national funds were more able to handle risk asymmetries than smaller local funds and voluntary national societies, open to workers of all occupations, came to dominate the workers' health insurance market in the coming decades (Andersson & Eriksson, 2017).

The evolution of health insurance societies accelerated the recruitment of new members in the late-nineteenth and early-twentieth centuries. The Workers' Insurance Committee estimated that 138,726 individuals were insured by mutual organizations (based on a sample including approximately ninety per cent of all health insurance societies) in 1884. For the societies associated with

a specific occupation, they also suggested that thirty per cent of the industrial workers employed at factories were members, but only six per cent of craftsmen were affiliated. In total, 21 per cent of workers in manufacturing industry were members (Arbetareförsäkringskomitén, 1889). However, some later surveys suggested that approximately eighty per cent of male workers employed in manufacturing industries were insured by the turn of the century (Elmquist, 1899, 1904, 1909). Surveys based on early twentieth-century health insurance society data also reported high levels of insurance coverage in major urban areas regardless of occupation (Försäkringsinspektionen, 1907). 82 per cent of working-class families in major urban areas were associated with health insurance societies in early 1910 (Socialstyrelsen, 1919b).

Although the Workers' Insurance Committee attempted to estimate the proportion of workers who were eligible for accident insurance in specific sections of the population, it did not attempt to estimate the size of the entire workforce for whom accident insurance might have been necessary. A first attempt to estimate the 'eligible' workforce was undertaken by the Old Age Committee, which suggested that approximately 900,000 men and 450,000 women were eligible for accident insurance at the turn of the twentieth century (Försäkringsinspektionen, 1915), but these figures seem implausibly high. In 1918, when the statutory scheme came into operation, it only covered 1.31 million workers, even though the number of individuals aged 16–64 had increased by 18.5 per cent since the start of the century (Statistiska centralbyrån, 2021; Riksförsäkringsanstalten, 1922).

The second half of the nineteenth century also witnessed an increase in the number of employer-backed occupational welfare schemes, initially as part of an attempt to discourage the growth of trade union membership. For example, in the late-nineteenth century, the owners of a pottery factory in the southern town of Höganäs offered workers potato fields, free accident and health insurance and pensions if they agreed not to form a union (Nycander, 2008, p. 19). However, once unions began to form, they often negotiated accident insurance and compensation schemes with their employers. The Old Age Committee estimated that 68,000 workers were covered by such agreements in 1892, and official data suggest that, by 1908/9, half of all industrial and handicraft workers were covered by union agreements. In some trades, including mining, metal, tanning and rubber, the coverage ratio was up to 80 percent, even though the figure in other industries was much lower (Lundh, 2020, p. 125). The expansion in the number of union agreements reflected the growing strength of the labor movement and its capacity for strike action but many employers also sought uniform contracts as a way of limiting unions' negotiating options.

The growth of these agreements also reflected an increasingly important feature of Swedish labor relations (Kjellberg, 1983, pp. 215–216). Many conservatives supported the labor movement and union organization, and the liberals were its ally. The state did not interfere in any of the large labor market conflicts in early twentieth century, which gave the labor unions considerable room for maneuver and deprived the employers of both public and political support. These circumstances allowed the Swedish labor movement to become the strongest in the world by the mid-1930s, even though Sweden was run by the conservatives at the time (Nycander, 2008, p. 96–97).

Research on collective agreements as a source of social protection is not that common (Jansson & Ottosson, 2021). However, even after the introduction of statutory arrangements, ninety per cent of all union agreements included accident insurance. This was particularly important during the long waiting periods associated with the initial statutory scheme (Sociala Meddelanden, 1917:12). The growing importance of these arrangements is also reflected in the accident statistics, where the number of beneficiaries by type of insurance provision was reported. The returns by employers on the number of individuals receiving compensation for accidents resulting in the loss of three or more working days suggest that 70 per cent of beneficiaries received insurance benefits in 1913, while 30 per cent were compensated directly by employers under the 1901 legislation. However, although most workers in manufacturing industry, transport

and construction and part of the service sector were covered by accident insurance before the implementation of statutory provision, the benefit schemes differed substantially. Some employers offered only the minimum requirement benefit schedule stipulated by the 1901 Act, while others provided benefit schemes with both accident insurance at work and at home, along with coverage for medical expenses. These variations fueled growing demands for the further expansion of statutory provision.

3. Statutory responses to occupational risk

Before workers' compensation was introduced in 1901, industrial workers relied on the tort law for making claims on employers, and had to be able to prove that the employer had caused the accident. Negligence by the employer was however difficult to prove and few accident cases were taken to court (Arbetareförsäkringskomitén, 1888). The first step towards public insurance was initiated by a Parliamentary bill and the decision of the Swedish Parliament to appoint the 'Workers' Insurance Committee' (*Arbetareförsäkringskomitén*) in 1884 (Englund, 1976; see also, Andersson & Eriksson, 2015, p. 248). The Committee's brief was to investigate 'the relation of employers and employees when it comes to workplace accidents and ... pensions for workers' (Englund, 1976). The Workers' Committee noted in 1889 that all 'civilized' countries had received some kind of workplace accident insurance and that it was time for Sweden to introduce one as well (Arbetareförsäkringskomitén, 1889). The Committee's first legislative outcome was the Health Insurance Society Act of 1891. The Act introduced a national system of voluntary registration for health insurance societies to encourage sounder financial routines and offered a small subsidy to registered funds to help defray the costs of registration and preparing an annual financial report (Lindqvist, 1990). However, the subsidy was small and did not provide support for the cost of insurance itself.

The first major landmark for Swedish workers' protection was the Employers' Liability Act of 1901 (see Table 2). Its immediate aim was to require employers to compensate workers following workplace accidents. It also gave employers the option of insuring workers in a public insurance organization, the *Riksförsäkringsanstalten*, or in insurance companies (mutual or joint-stock), instead of compensating them directly. However, it had three main limitations. Workers had to wait for sixty days in order to qualify for benefit; the benefits themselves were paid on a flat-rate basis; and workers who suffered a permanent disability received an annuity which was worth less than one-third of the average annual wage (Svensk Författningssamling [SFS], 1901, p. 39). The loss of income during the waiting period was supposed to be addressed by membership in mutual health insurance societies. In this way, the design of the scheme reflected the prevailing ideology of using state intervention to promote self-help and the system of voluntary mutual support against workplace accidents became integrated in the statutory insurance scheme (Berge, 1995).⁵

As we have already seen, the second half of the nineteenth century witnessed a substantial increase in the numbers of both independent and employer-backed health insurance schemes. However, many workers resented the compulsory nature of the employer-backed schemes and many of the independent schemes suffered financial problems as a result of their small size. The Sickness Insurance Act of 1910 aimed to address both of these issues. The new Act removed the employers' ability to compel workers to join specific employer-founded and managed health insurance societies and required societies to have at least one hundred members before they could register. It also removed the upper limit on membership and sought to make membership more accessible by preventing societies from excluding applicants on obscure grounds or if they moved or changed workplace. The Act also formalized the health insurance societies' obligation to pay members' claims during the sixty-day waiting period in all cases where there was evidence of 'considerable impairment' (Johansson, 2003).

Table 2. Government regulation of sick and accident insurance in Sweden.

Year	Legislation	Mutual	Voluntary	Regulation	Funding	Eligible	Kind of coverage	Benefit determinant	Waiting time	Duration (days)
1891	Health insurance societies Employers' Liability	Yes	Yes	Law, Charter	Individual premium, state subsidy	Sickness, Accident, Death*	Sick leave, death*	Individual premium	2-7 days	90-365
1901	Employers' Liability	No	No	Law	Employers' compensation	Accident, Death	Sick leave, Invalidity, death	Flat rate	60 days	≥60
1910	Health insurance societies	Yes	Yes	Law, Charter	Individual premium, state subsidy	Sickness, accident	Sick leave	Individual premium	2-7 days	90-365
1913	Old-age pensions	No	No	Law	Individual national insurance contributions and state payments	Anyone incapable of working on account of disability or having reached the age of 67	Pension	Disability status or age	N/A	Indefinite (until death)
1916	Statutory Accident Insurance	No	No	Law	Employers' social contribution	Accident, Death	Sick leave, Invalidity, death	Gross income (2/3 compensation)	35 days	≥35

Note: Only specific sickness (and burial) funds provided funeral/burial insurance.

Sources: Svensk författningssamling (SFS 1891, p. 81) Lag om sjukassessor; SFS (1901:39), Lag om ersättning för skada till följd av olycksfall; SFS (1910:77) Lag om sjukassessor; "SFS," (1916, p. 235), Lag om olycksfall i arbete; Edebalk and Harrysson (2010, p. 2).

Although the Act aimed at making health insurance through mutual societies more accessible, it also ensured that the schemes did not become too generous in their search for new members. It had previously been common for the entire family to be eligible for sickness benefits if the head of the household was insured but the 1910 Act limited eligibility to the insured member alone. Health insurance benefits and waiting periods were also harmonized to avoid competition between societies. Although health insurance societies were criticized for not reaching the most vulnerable individuals – resulting in underinsurance – the government was more concerned with the risk of over-insurance. Individuals had previously been able to make their own risk-assessments and insure in more than one society. The 1910 Act prohibited members from ‘double insuring’ since this could reduce incentives to avoid sickness and accidents and generate ‘moral hazard’.

Taken together, the Employers’ Liability Act of 1901 and the Sickness Insurance Act of 1910 granted voluntary health insurance societies a central role in providing sickness benefits in the event of loss of income during the first sixty days of workplace absence due to workplace accidents. The two Acts therefore assumed and encouraged workers’ voluntary membership in health insurance societies for protection in the case of workplace accidents. However, waiting periods remained long, benefits were low and agricultural workers – who constituted almost half of the occupied workforce – continued to be excluded.

There was also growing support from employers for further changes. These concerns were based on two considerations. In the first place, many employers believed that statutory provision would help to place wage costs on a more equal footing. Second, they also thought that the enhancement of statutory protection would reduce the demand for emigration by giving workers a greater sense of security. This would help to keep wage costs down by preventing labor shortages (Edebalk, 1993).

The limitations of the 1901 and 1910 Acts were also exposed by the Committee on Old Age Insurance. This Committee was established in December 1907 to investigate the need for both old age and invalidity insurance schemes. Its plans for the creation of an old age insurance scheme resulted in the passage of a new Pensions Act in 1913 (Elmér, 1960) and its accident insurance proposals underpinned the establishment of the new accident insurance law in 1916 (“Proposition” 1916: 111; Försäkringsinspektionen, 1915). The new law broke new ground both in relation to its method of funding and the provision of accident insurance benefits.

In addition to offering pensions to anyone over the age of 67, the Pensions Act also authorized payments to those who were judged to be permanently unable to work as a result of either accident- or sickness-related disability and was financed by a combination of individual national insurance contributions and tax-funded state subsidies. Critics argued that these arrangements reduced the incentive for employers to maintain a safe working environment and subsidized employers who failed to do so; they also argued that occupational injuries ought to be regarded as production costs, which the employer should bear. Consequently, when the new accident insurance scheme came into operation, it was financed by contributions from employers (Riksdagens skrivelse, Nr 242).

The new scheme assumed that the majority of workers would obtain insurance through employers’ associations; these operated alongside the National Insurance Institution, or *Riksförsäkringsanstalten*. The *Riksförsäkringsanstalten* was responsible for regulating the insurance market and insuring those risks which could not be covered by private undertakings (International Labour Office, 1925, p. 340). The Government initially proposed that the waiting period for new claims should be reduced from sixty days to four days but this was subsequently amended to 35, although it was expected that the employers’ associations would provide cover within this period.⁶ The Act also stipulated that the existing system of flat-rate benefits should be replaced with a new system of earnings-related benefits, under which claimants would receive a sum equal to two-thirds of their previous wage, and extended coverage to agricultural workers and civil servants, as well as introducing risk-differentiated premiums and making accident insurance compulsory (“Proposition,” (1916: 111)).

These changes meant that workers were now able to obtain accident insurance voluntarily, through membership of either a mutual health insurance society or an employer-backed scheme, as well as through the compulsory national scheme. In previous years, the health insurance societies had sought to avoid the problem of 'over-insurance' by prohibiting membership in more than one society, but the Workers' Insurance Committee argued that the problem of over-insurance among those who were eligible for both statutory and voluntary benefits was less easily addressed. It recognized that the combined value of the two types of insurance could generate benefits that were higher than the salary of the insured worker but argued that, since sickness benefits were based on voluntary savings, it was not for politicians to decide on benefit restrictions.

The government wanted the benefits of the statutory workplace accident insurance of 1916 to constitute a 'sufficient but not excessive' share of the worker's income (Berge, 1995). This sufficient share was estimated to be two-thirds. The government believed that workers needed to be encouraged to take responsibility for their own safety, and that overinsurance might encourage recklessness and undermine productivity. In contrast to the Workers' Insurance Committee, it therefore sought to restrict the benefits a worker could receive from health insurance societies in the case of workplace accidents. However, Parliament followed the Workers' Insurance Committee in rejecting the initiative. The opportunity to over/double insure remained until 1931 and this ensured that voluntary provision continued to operate alongside the statutory scheme throughout the 1920s (Berge, 1995).

As P. G. Edebalk (1993, p. 111) suggested, the new scheme compared very favorably with the schemes which were coming into existence in other parts of the world, although the claim that the new measure catapulted Sweden to the top of an international league table for accident insurance provision may have been excessive. In 1925, the ILO published a comprehensive account of all the accident insurance schemes which existed at the time. Although it suggested that the Swedish scheme had fewer exclusions than the majority of existing schemes and provided a more generous set of benefits, it may also have exaggerated the generosity of the Swedish scheme by suggesting that the waiting period was much shorter than was actually the case (see also note 2 above).

The ILO report identified two different ways in which accident insurance schemes had developed internationally. Many countries began by identifying a list of dangerous occupations and then adding to it over time, whereas a second group accepted that industrial accidents could occur in most, if not all, occupations and designed their schemes accordingly. The first group of countries considered the worker 'from the point of view of the industry in which he [*sic.*] was employed' whereas the second considered him (or her) 'from the point of view of carrying on an occupation in the service of an employer and receiving remuneration', without regard to their source of employment (International Labour Office, 1925, p. 12). Within this group, Sweden had fewer exclusions than many others. It applied to all workers except home workers and fishermen (*sic.*), but the latter group could join the scheme voluntarily.

As we have already seen, the Swedish scheme included both voluntary and compulsory elements. It allowed workers to choose from a range of approved providers but the fact that enrolment was automatic meant that membership of the scheme as a whole was compulsory. The ILO was agnostic on the question of whether it was a good idea to offer a choice of providers but it believed that the principle of compulsion 'brings all those insured under definite and uniform regulations ... minimizes disputes and procedure ... automatically guarantees the payment of compensation ... [and] makes the industry of a country as a whole contribute towards payment of damages for accidents, thus establishing between employers ... a solidarity which is of great social value' (International Labour Office, 1925, p. 330).

From the individual worker's perspective, the most important considerations were presumably related to the range and value of the benefits on offer. The International Labour Office (1925, p. 264) argued that the Swedish scheme had a waiting period of only four days, and that workers who were absent from work for more than four days could claim benefits from the first day, but this appears to have been based on the original proposal rather than the final settlement (see also note 2). As we

Table 3. Workers' compensation and accident insurance: 1925 replacement rates⁹.

		Death benefits			Incapacity benefits		
	Lump sum*	% of normal/annual earnings	Lump sum*	% of normal/annual earnings [†]			
Benefit	State/country	Benefit	State/country	Benefit	State/country	Benefit	State/country
5x annual earnings	Denmark, Greece, Italy	100.00%	Serb-Croat-Slovene Kingdom	10x annual earnings	Denmark (in cases of permanent incapacity)	100.00% (with additional provision for more serious incapacity)	Serb-Croat-Slovene Kingdom
4x annual earnings	Brazil, Canada (Quebec)	66.67%	Austria, Czechoslovakia, Estonia, Hungary, Latvia, Lithuania Poland (former Austrian and German territories), Romania, Russia, Sweden, Uruguay	6x annual earnings	Greece, Italy (industrial workers)	70.00% (with additional provision for more serious incapacity)	Netherlands, Switzerland
3x annual earnings	Argentina, Australia, Great Britain, Irish Free State, Newfoundland, New Zealand, Canada (Saskatchewan)	60.00%	Chile, Cuba, Finland, France, Germany, Guatemala, Luxembourg, Netherlands, Poland (former Russian territories), Portugal, Switzerland	3.5x annual earnings	India	66.67% (with additional provision for more serious incapacity)	Austria, Czechoslovakia, Estonia, Germany, Hungary, Latvia, Luxembourg, Poland, Romania, Russia, Sweden
2.5x annual earnings	India	50.00%	Norway	3x annual earnings	Argentina, Brazil, Canada (Saskatchewan), South Africa	66.67%	Australia (New South Wales and Victoria), Canada (Manitoba and Ontario), Denmark (in case of temporary incapacity), Ecuador, Finland, France, Lithuania, Portugal, Uruguay
2x annual earnings	Bolivia, Panama, Salvador, South Africa, Spain	33.33%	Peru	2x annual earnings	Bolivia, Ecuador, Salvador, Spain	62.50%	Canada (British Columbia)
1x annual earnings	Ecuador			1.5x annual earnings	Panama	60.00%	Guatemala, Norway (industrial scheme)

(Continued)



Table 3. (Continued).

Death benefits			Incapacity benefits		
Lump sum*	Benefit	% of normal/annual earnings	Lump sum*	Benefit	% of normal/annual earnings†
State/country	State/country	State/country	State/country	State/country	State/country
0.5x annual earnings	0.5x annual earnings		0.5x annual earnings		
Japan	Japan	Japan	Japan	New Zealand	Canada (Alberta, New Brunswick and Nova Scotia)
				58.00%	Bulgaria
				55.00%	50–80% (with additional provision for more serious incapacity)
				50–75%	Great Britain
				50.00%	Australia (except New South Wales and Victoria), Belgium, Canada (Quebec), Chile, Irish Free State, Newfoundland
				33.00%	Peru

Note: * As the International Labour Office (1925, p. 267) pointed out, the payment of lump sums, especially in cases of permanent incapacity, was usually less satisfactory, since values tended to be calculated at lower rates and payments tended to run out before the need for them had expired. † It should be noted that different countries used different methods to estimate 'annual earnings' when calculating benefits in cases of temporary incapacity. In Belgium and Sweden, annual earnings were divided by 365 in order to calculate an appropriate 'day rate', whereas the authorities in Denmark and Norway based their calculations on 1/300 of the estimated value of annual earnings. Many other countries based their calculations on the value of the claimant's daily earnings at the time of the accident 'no doubt considering that the relatively small total amount of compensation normally paid for temporary incapacity makes the elaborate calculation of average earnings unnecessary (International Labour Office, 1925, p. 191). Source: International Labour Office (1925, pp. 191–2, 224–5, 266–7, 271–2).

have already seen, the scheme actually had a 35-day waiting period, although employers were encouraged to provide compensation within this ("SFS," 1916: 235, §6 & §35). In addition to providing compensation for both partial and complete incapacity, and for incapacity which led to either temporary or permanent absence from work, the Swedish scheme also contributed to the funeral costs of workers who died as a result of an industrial accident, and provided death benefits to their children (up to the age of sixteen) and spouses (International Labour Office, 1925, pp. 222–223, 233). When the ILO compared the value of the insurance benefits with normal wage levels, it found that the Swedish scheme was more generous than the majority of such schemes, but less so than the schemes on offer in Switzerland and the Kingdom of Serbia-Croatia-Slovenia (see Table 3).

Although previous writers have tended to applaud the growth of the Swedish scheme, this assessment relies on the assumption that the expansion of statutory provision met a genuine need, was not accompanied by a reduction in existing voluntary arrangements, and did not lead to any reduction in workers' wage levels. These assumptions have been queried by students of the history of both accident insurance and other forms of statutory welfare provision in other countries (see e.g. Emery, 2010; Green, 1993; Lehmann-Hasemeyer & Streb, 2008; Murray, 2007). What light might the history of Swedish accident insurance shed on these claims?

4. The need for statutory provision

One of the theoretical limitations of voluntary insurance schemes is the number of individuals who are left unprotected by them. This problem holds especially for individuals and employers facing low risk, unless premiums are adjusted to that risk. One way to indicate the presence of underinsurance is to compare the number of insured people with the size of the 'at risk' workforce, or the population 'eligible' for accident insurance.

To give an estimate of changes in the number of workers' 'at risk', we have utilized statistics on the number of employees in the economy as a whole, as estimated by Jungenfelt (1966) and Schön and Krantz (2012). We assume that the relevant population is restricted to workers (excluding self-employed, farmers etc.) who were employed in agriculture, manufacturing industry, building/construction, transport and services. Our estimates suggest that the total number of workers 'at risk' in 1885 was 853,000. This number grew to 1.092 million in 1900, but this was still well below the figure suggested by the Old Age Committee (1.35 million). Our estimate for 1918 (1.36 million) is very similar to the number covered by the statutory insurance scheme in the same year (1.31 million).

Compared to the 'at risk' population in Figure 2, the proportion of individuals who belonged to mutual health insurance societies rose substantially in the late-nineteenth and early-twentieth centuries: from only 16 per cent in 1884 to 41 per cent in 1906. This figure continued to rise during the following decade, reaching 52 per cent in 1913 and 56 per cent in 1918. However, these figures are significantly lower than the estimates obtained from contemporary surveys of workers in factory-based manufacturing and urban wage-workers (see section 2). Hence, under-insurance still seems to have been a concern for wage workers in rural areas and in non-factory based industries before the 1916 Act took effect.

Although the 1901 Act introduced new forms of protection, there was a fairly long waiting period. This meant that workers still had an incentive to demand insurance through union agreements. The incidence of collective agreements reflected the different levels of risk between industries, where workers who faced the greatest risks had the strongest incentives to demand insurance through union agreements. This was reflected in a positive pair-wise correlation between the proportion of workers who were eligible for accident insurance and the incidence of 'short-duration' accidents (see Appendix B).

Although this paper is primarily concerned with the specific issue of accident insurance, it also has implications for the development of other forms of sickness insurance. In the case of the USA, both Murray (2007) and Emery (2010) argued that the quality, accessibility and capacity of the existing schemes rendered a statutory health insurance scheme unnecessary. In the UK, the long-serving secretary of the Charity Organisation Society, Charles Stewart Loch (1913: 328), claimed that the introduction of statutory health insurance represented the 'death warrant' of the smaller friendly

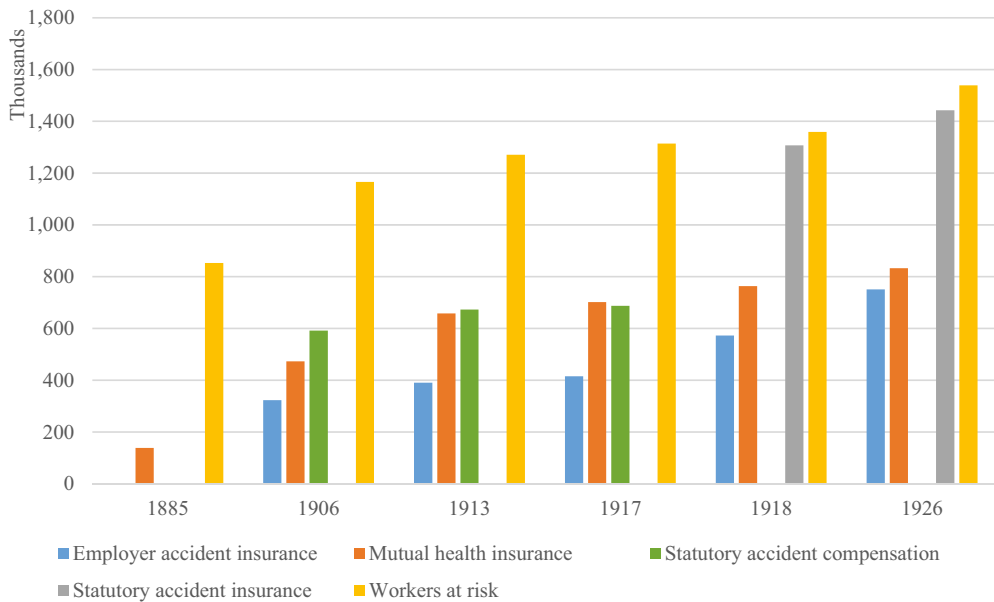


Figure 2. Workers at risk and insurance by employer's accident insurance, mutual health insurance, and statutory accident insurance in 1885, 1906, 1913, 1917, 1918 and 1926.

Sources: Cols. 1–2: Arbetareförsäkringskomitén, (1889); Kommerskollegie (1908); Socialstyrelsen (1916); Riksförsäkringsanstalten (1921); Riksförsäkringsanstalten (1922); Riksförsäkringsanstalten (1928); Arbetsstatistik (1909); Socialstyrelsen (1915); Socialstyrelsen (1920b); Socialstyrelsen (1921b). Col. 3: Jungenfelt (1966). Col. 4: Schön and Krantz (2012): Table 5B.

societies and some more recent commentators have argued that the introduction of statutory health insurance undermined the pre-existing mutual arrangements provided by friendly societies, even though they were given responsibility for administering national health insurance, alongside other providers, and retained the right to offer additional services to 'voluntary' members (see e.g. Green, 1993). However, in contrast to these arguments, Harris (2018) claimed that the voluntary schemes were already encountering problems before 1911, and that the statutory scheme was not so much a cause of these problems as a response to them.

Given these arguments, it is important to ask how the development of the statutory scheme affected both the coverage of accident insurance in Sweden and the value of the benefits on offer. As we have already seen, the design of the Swedish scheme meant that Swedish workers continued to be motivated to join voluntary insurance schemes alongside the statutory scheme. However, it also stipulated that only employer-backed associations could provide insurance within the statutory scheme and this gave these associations a significant advantage over mutual health insurance societies in the competition for voluntary members. Figure 2 provides an illustration of each of these effects. It shows that there was a small increase in the number of workers who obtained accident insurance through mutual health insurance societies after 1918, and a much larger increase in the number of workers who obtained voluntary insurance through employer-backed associations.

Although there was only a relatively small increase in the number of workers who belong to mutual health insurance societies after 1918, these societies continued to make an important contribution to the overall increase in benefit expenditure. Figure 3 shows that the real value of the benefits provided by the different schemes (in 1913 prices) increased from 1.5 SEK per worker in 1885 to 4.2 SEK per worker in 1906 and 7.9 SEK in 1913. Although expenditure declined during the period of the First World War, it increased steadily after the 1916 Act came into operation, and reached the equivalent of 11 SEK per worker (at 1913 prices) by 1926. Payments by mutual health insurance societies were responsible for 39 per cent of the increase in expenditure between 1917

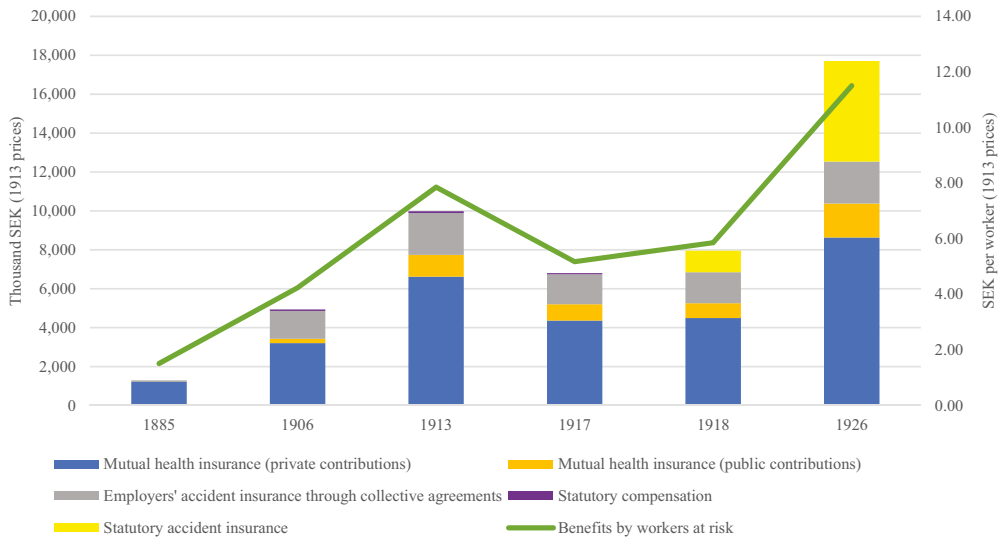


Figure 3. Real insurance benefits* in thousand SEK (1913-year price level) by employers' accident insurance, mutual health insurance, and statutory accident insurance in 1885/6, 1906, 1913, 1917, 1918 and 1926.

Source: Riksförsäkringsanstalten (1922); "Försäkringsföreningen," (1886); Försäkringsinspektionen (1907, 1915, 1919, 1920); Arbetarförsäkringskommittén, (1889); Arbetsstatistik (1909); Socialstyrelsen (1915, 1920b, 1921b).

Note: Statutory compensation was calculated by multiplying benefit rates (1 SEK/day or 300 SEK per year) by the number of work-days lost (adjusted for 60 days' waiting time) among the uninsured. * Benefits denoting annual pay-outs to workers, excluding financial provision and reserves for future claims. Mutual health insurance societies were financed mainly by contributions from members and employers. Public contributions/subsidies were initially small, but increased over time.

and 1926, state subsidies to mutual health insurance societies for eight per cent, accident insurance through collective agreements six per cent and statutory accident insurance 47 per cent. The increase in pay-outs of statutory provision was driven in almost equal shares by invalidity/annuity benefits (55 per cent) and sickness benefits (45 per cent).

Although the benefits offered by statutory provision rose substantially, this does not appear to have led to a similar reduction in the number of workers belonging to mutual health insurance societies, or in those eligible for accident insurance through collective agreements, since the figures for both members and benefits also expanded after the 1916 Act. We find no evidence suggesting crowding-out of voluntary insurance provision following the implementation of statutory accident insurance. If any crowding-out followed the introduction of the statutory scheme, we need to consider potential effects through other mechanisms.

5. Crowding-out of self-insurance capabilities

Although we have found little evidence to suggest that the introduction of statutory accident insurance 'crowded out' voluntary schemes, it may have influenced savings behavior in other ways. If the scheme had been financed in the same way as the pension scheme, it might have reduced the demand for voluntary insurance by reducing workers' discretionary income. They might also have had less incentive to save voluntarily if they were confident that the statutory scheme would meet all their future requirements without the need for voluntary provision. Finally, if employers passed on the cost of their own contributions to their employees by reducing wage payments, this would also reduce the income available for voluntary saving (see Fishback & Kantor, 1996, 1992, 1995, 1998, 2000, p. 54–87; Lehmann-Hasemeyer & Streb, 2008). It is therefore important to ask whether the statutory scheme introduced in 1918 led to any significant erosion of workers' wage levels.

Table 4. Summary statistics of blue-collar wages and statutory accident insurance premiums by high risk industries and non-high-risk industries during the period before and after the implementation of the 1916 act of statutory accident insurance.

Group	Variable	Pre-statutory provision		Post-statutory provision*	
		mean	st.dev.	mean	st.dev.
High-risk industries**	Annual real*** wages (SEK)	1196.18	231.65	1197.53	306.32
	Annual real premium, (SEK)	0	0	12.49	5.42
	Relative**** wage, (%)	104.07	19.82	97.64	22.86
	Relative premium, (%)	0	0	1.10	0.49
Non-high risk industries	Annual real wages (SEK)	1132.35	227.41	1237.76	302.25
	Annual real premium (SEK)	0	0	4.08	2.71
	Relative wage, (%)	98.46	19.24	100.85	23.10
	Relative premium, (%)	0	0	0.33	0.21
	Observations	237		431	

Source: Riksförsäkringsanstalten (1921), (Riksförsäkringsanstalten, 1922), (Riksförsäkringsanstalten, 1923), (Riksförsäkringsanstalten, 1924), (Riksförsäkringsanstalten, 1925), (Riksförsäkringsanstalten, 1926), (Riksförsäkringsanstalten, 1927), (Riksförsäkringsanstalten, 1928), (Riksförsäkringsanstalten, 1929), (Riksförsäkringsanstalten, 1930); Socialstyrelsen (1919a), (Socialstyrelsen, 1920a), (Socialstyrelsen, 1921a), (Socialstyrelsen, 1922), (Socialstyrelsen, 1924a, (1924b), (Socialstyrelsen, 1925), Socialstyrelsen, 1926), (Socialstyrelsen, 1927). *Post statutory provision denotes the period 1918–1926, and pre-statutory provision denotes the period 1913–1917. **High-risk industries make up 25% of the sample facing the highest risk defined by accident premiums (p. 75). ***Real wages and premiums are deflated by cost-of-living index into 1913-year price level: **** Relative wages denote each subindustry wage level in relation to average wage level of all sub industries.

Under the Accident Insurance Act, employers were required to cover the entire insurance costs associated with work-place accidents (SFS, 1916, §2, §6). Workers were only beneficiaries, and did not make any direct contribution, either individually or collectively. The government covered the scheme's administrative/overhead costs (Riksförsäkringsanstalten, 1921). The premiums paid by the employers were calculated on the basis of workplace accidents at actuarially-fair rates by industries (equal to employers within the same sub-industry; SFS, 1916, §15). The tariffs implied that employers in sub-industries with a relatively higher workplace accident risk faced higher premiums than those in low-risk industries. As shown in Table 4, the premiums were three times higher in the 25 per cent most risk-exposed industries compared with the non-high risk industries. Without adjustments in gross wages, the scheme would imply that employers in high-risk industries offered more benefits (other things being equal) to their workers after the reform, as we cannot find any cut-backs in the voluntary arrangements (see Figure 3). However, an alternative scenario would be that employers cut down on gross wages to maintain the gross profit share in high-risk industries in particular.

In order to examine this issue, we have employed a difference-in-difference (DID) analysis (see Angrist & Pischke, 2008). We compare changes in the wages paid to workers in different groups of industries before and after the introduction of statutory provision. We focus on wage development due to the design of the insurance scheme, and control for any confounding effects of observable and unobservable characteristics at the sub-industry level by using fixed-effects estimates (see Greene, 2012).

The analysis is based on a panel of 48 sub-industries including firms with more than five employees ('larger employers') for which data on both wages and accidents are available before and after the implementation of statutory accident insurance (1913 to 1926).⁷ We have divided the panel into one group of 'high-risk industries' in the upper quartile of the risk distribution and one group of 'non-high-risk' industries in the three lower quartiles of the risk distribution. The high-risk industries include sub-industries within Mining and Metal Industries; Stone, Clay and Glass Industries; Wood Products Industries; Chemical Industries; and the Building and Construction industry.

Table 4 provides summary statistics of the two sub-industry risk groups before and after the implementation of statutory accident insurance in 1918. Before implementation (pre-statutory provision), real wages were higher among blue collar workers occupied in the high-risk industries. However, after the

Table 5. DID analysis of the impact of 1916 statutory accident insurance on workers wages.

Variables	Models		
	(1)	(2)	(3)
Treatment period (Years 1918–1926)	–0.00343 (0.00903)	0.0203* (0.0104)	0.0203* (0.0104)
Treatment group (High-risk industries)	–0.00276 (0.0636)	0.0533 (0.0649)	
Treatment period # Treatment group		–0.0873*** (0.0200)	–0.0874*** (0.0200)
Constant	1.003*** (0.0333)	0.987*** (0.0335)	1.002*** (0.00715)
Industry and year fixed effects	No	No	Yes
Observations	668	668	668
R-squared	0.0000	0.0073	0.030

Source: See [Table 3](#).

Note: Robust standard errors clustered at the firm level in parentheses.

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

implementation of the Act, we observe a slower wage increase in the high-risk industries compared to the non-high-risk industries, resulting in a significant shift in the relative value of the wages paid to workers in high- and non-high-risk industries over the course of this period.

To further explore the impact of the 1916 Act on blue collar workers' wages (cash payment), we have examined the difference-in-difference (DID) on relative wages (see [Table 4](#)) in high-risk and non-high-risk industries before and after the 1916 Act came into operation. The analysis examines whether the face value difference in wage development is significant even after controlling for period, group, and fixed effects.

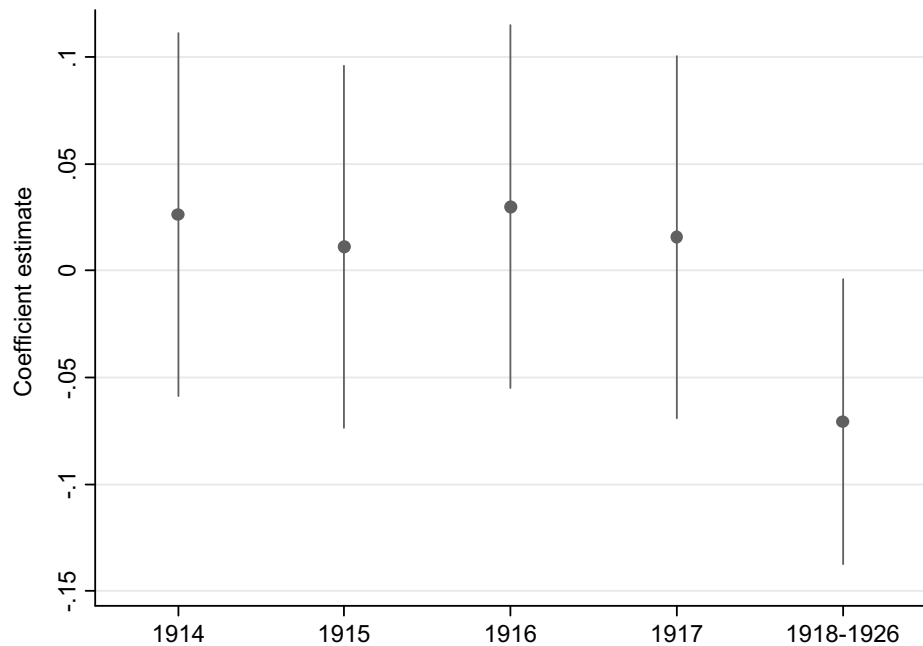


Figure 4. Coefficient estimate of pre-trend before the implementation of statutory accident insurance in Sweden in 1918. Source: See [Table 3](#).

Note: Coefficient estimate reported in [Table 1, Appendix B](#).

Table 5 shows the results of three estimated models. In the first model, we only run treatment period (1918–1926) and treatment group (high-risk industries) to see if these controls matter. The controls are insignificant. In the second, we interact the treatment period with the treatment group to capture the DID. The estimate is significant and negative. This holds after adding industry and year fixed effects, as shown in model 3. The coefficient estimates on relative wage differences suggest that the benefits of statutory provision for this group of workers were almost entirely offset by reductions in net wages. The advantage which workers in high-risk industries had enjoyed before 1918 was now reversed.

However, any impact of 1916 statutory accident insurance on workers' wages shown by the DID-analysis rests on the assumption that wages in the two sub-industry risk groups developed in parallel up until the implementation of the 1916 Act. To test for any outcomes before the implementation, we have run an event study test that allows for leads in the period before the accident law was implemented. We use four leads and the same sub-industry panel data used in the estimation presented in Table 4.

Figure 4 shows the coefficient estimates of the pre-trend assumption before the implementation of statutory accident insurance. All four leads are insignificant and close to zero (while the DID-coefficient 1918–1926 is negative and significant). The finding shows that the parallel trend assumption holds, and that the impact on wages was persistent over the period 1918–26.

6. Conclusions

Sweden has long been regarded as a pioneer of welfare development and as the paradigm example of a 'social democratic' welfare state (see e.g. Esping-Andersen, 1990). The focus on providing a narrative of public welfare has, however, tended to obscure the expansion of mutual insurance societies and employer compensation schemes. This paper highlights the dual system of statutory and voluntary welfare protection against work-place accidents in Sweden from the late nineteenth century up until the 1920s.

The starting point of workers' welfare protection is related to the emerging 'modern' industrial economy that caused an increasing number of workplace accidents, especially in highly mechanized industries. The growing demand for new protections led to an increase in the membership of voluntary mutual health insurance societies and in the growth of employer-based compensation schemes through collective agreements. However, there was also a growing demand for enhanced forms of statutory protection, culminating in the passage of the statutory accident insurance law of 1916.

One of the most contentious features of the debate which preceded the introduction of the 1916 Act was the question of over-insurance. Although the Government intended to prohibit 'over-insurance', Parliament rejected this and this ensured that workers continued to have a strong incentive to join voluntary insurance schemes alongside their membership of the statutory scheme. However, the design of the statutory scheme provided employers' associations with a competitive advantage in the market for voluntary insurance provision.

The introduction of the statutory scheme also had a significant effect on relative wage levels. One of the scheme's most significant features was the introduction of differentiated premiums for industries with different levels of risk. Prior to 1918, workers in 'high-risk' industries had enjoyed something of a 'wage premium' but this was reversed after the Act came into operation. However, even though the Act led to an overall increase in employers' costs, it did not lead to a reduction in wage levels overall.

These findings demonstrate the extent to which the expansion of public welfare provision was rooted in the growth of new social risks and the inability of existing arrangements to respond adequately to these. However, they also show that the expansion of public welfare provision was not a purely linear development and that it could be accompanied by reductions in the relative

welfare of some groups of workers. Above all, they highlight the need to place the expansion of public welfare provision in the broader context of the 'mixed economy of welfare' and the operation of the wider economy.

Notes

1. For a full list, see [Appendix A](#).
2. The government bill proposed a 4-day waiting period for the compulsory accident insurance ("Proposition" 1916: 111, §6). The parliament accepted the bill, but with major changes. The Act itself imposed a 35-day waiting period for the statutory accident insurance (SFS 1916: 235, §6). During the waiting period, employers had the option of providing voluntary accident insurance, even without a waiting time (SFS 1916: 235, §35).
3. SFS, *Legostadgan 23 November 1833, § 6*: obliges masters to care for 'worthy' servants, from the age 30 and onwards, in the case of old age or sickness. *Sjölagen 12 June 1891*: obliges shipping companies to support sailors in the case of sickness and accidents; shipping companies also had to subsidize sailors' health insurance societies. *Hammarsmedsordningen 26 August 1823*: mill-owners had to establish sickness funds and provide accident and sickness insurance, together with old-age support, for blacksmiths and (if appropriate) their widows. If a blacksmith was affected by sickness or accident, and unable to work for three weeks or more, he was granted some kind of support. The law was dissolved in 1859 by the extended right to conduct business in mining, but the health insurance societies remained. The poor relief regulation of 9 June 1871 stipulated that an employer who conducted business in a region and used its workforce had to contribute to the cost of poor relief in the area where he was conducting business. A special regulation was implemented regarding railway hazards in 1886. The regulation stipulated that the employee was entitled to compensation in the case of accident or death, unless they had caused the accident themselves.
4. In some infrequent cases, the employer stipulated that the workers could join any sickness fund and financially supported the health insurance societies in the area.
5. The idea of using 'collectivist' solutions to promote individualism was not unusual – see e.g. [Freeden 1986](#), pp.194–244.
6. This may help to explain why the International Labour Office (1925, p. 264) claimed that Swedish workers became eligible for accident insurance benefits after four days.
7. For smaller employers and the public sector, only economy-wide aggregates are accessible for only a few indicators. Compared to the latter, it should be noted that the premiums paid by larger employers (>5 employees) were twice as high as those paid by smaller employers (≤5 employees) between 1918 and 1926.
8. We should like to thank Julia Moses for her help with the construction of this table.
9. Fishback and Kantor (2000, p. 208–23) provide information about the replacement rates associated with the benefits provided by different types of levels of injury in the different states of the United States. The benefits provided as compensation for fatal injuries ranged in value from the equivalent of 40% of weekly wages to 66.67%. The benefits provided in compensation for a five-week period of disability ranged from 50% to 66.67% of weekly wages, with the exception of Wyoming, which provided compensation at the rate of 100% (but Wyoming did not provide death benefits). The benefits provided in compensation for the loss of a hand in the first year of operation ranged from 15% of weekly wages to 66.67%.

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Notes on contributors

Lars-Fredrik Andersson is an associate professor in economic history and works on economic development and structural change, human well-being and social welfare, demography, and economic geography;

Liselotte Eriksson is an associate professor in economic history and works on social welfare and insurance.

Bernard Harris has worked on a wide range of topics within this field, including work on the history of height, morbidity and mortality; unemployment and poverty; the relationship between statutory and voluntary welfare provision; and the origins and development of the British welfare state.

ORCID

Lars-Fredrik Andersson  <http://orcid.org/0000-0002-1413-3707>

Liselotte Eriksson  <http://orcid.org/0000-0003-2591-6579>

Bernard Harris  <http://orcid.org/0000-0001-7118-1118>

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Appendix A.

Introduction of accident insurance and workers' compensation laws before 1918.⁸

Period	Date of first enactment
1884–1900	Germany (1884); Austria (1887); Czechoslovakia (1888); Norway (1894); Finland (1895); ^a United Kingdom (1897); Denmark (1898); France (1898); Italy (1898); Australia (1900); New Zealand (1900); Spain (1900)
1901–10 ^b	Greece (1901); Netherlands (1901); Sweden (1901); Luxembourg (1902); Belgium (1903); Russia (1903/4); ^c Mexico (1906); Hungary (1907); Bulgaria (1908); Newfoundland (1908); New South Wales, Australia (1910); Quebec, Canada (1910); Serbia (1910)
1911–18	<p><i>Australian states</i> South Australia (1911), Tasmania (1911); Western Australia (1912); Victoria (1915); Queensland (1916)</p> <p><i>Canadian provinces</i> Ontario (1914); Nova Scotia (1915); British Columbia (1916); Manitoba (1916); Alberta (1918); New Brunswick (1918)</p> <p><i>US states and territories</i> California (1911);^d Illinois (1911);^e Kansas (1911); Massachusetts (1911); New Hampshire (1911); Ohio (1911), Washington (1911); Wisconsin (1911); Michigan (1912); Rhode Island (1912); Arizona (1913); Connecticut (1913); Iowa (1913); Minnesota (1913); Nevada (1913); New York (1913);^f Oregon (1913); Texas (1913); West Virginia (1913); Louisiana (1914); Maryland (1914); Alaska (1915); Colorado (1915); Hawaii (1915); Indiana (1915); Maine (1915); Montana (1915);^g Oklahoma (1915); Pennsylvania (1915); Vermont (1915); Wyoming (1915); Kentucky (1916); Delaware (1917); Idaho (1917); Nebraska (1917); New Jersey (1917); New Mexico (1917); South Dakota (1917); Utah (1917); Virginia (1918)</p> <p><i>Other countries</i> Japan (1911); Peru (1911); Switzerland (1911); Romania (1912); Portugal (1913); South Africa (1914); Argentina (1915); Colombia (1915); Cuba (1916); Puerto Rico (1916)</p>

^aAlthough Huberman and Lewchuk (2003, p. 11) suggested that an accident law was introduced in Finland in 1893, both Knowles (1920, p. 31) and White (1943, p. 360) associated its introduction with 1895.

^bAlthough Moses (2018, p. 273) suggested that Mississippi introduced an accident compensation law in 1902, this is likely to have been a printing error. Fishback and Kantor (2000, p. 104) state that Mississippi only introduced such a law in 1948.

^cMoses (2018, p. 273) suggested that the first accident law in Russia was introduced in 1912 but Knowles (1920, p. 31) cited an earlier law of 1903 (replaced in 1913) and Ewing (1991, p. 915) argued that the first law was passed in 1904 (before being replaced in 1912).

^dAccording to Fishback and Kantor (2000, p. 104), California introduced a voluntary insurance law in 1911. This was replaced by a statutory law in 1913 (cf., Knowles, 1920, p. 31; Moses, 2018, p. 273).

^eFishback and Kantor (2000, p. 103–4) argue that Illinois introduced a voluntary insurance law in 1911. This was subsequently replaced by a statutory law (see also, Knowles, 1920, p. 31; Moses, 2018, p. 273).

^fAccording to Fishback and Kantor (2000, p. 103–4), New York introduced two workers' compensation laws in 1910. The first (a statutory law) was declared unconstitutional and the second 'was little use'. The first effective law was introduced in 1913.

^gMontana tried to introduce a workers' compensation scheme in 1909 but the resulting law was declared unconstitutional. A second Act was introduced in 1915 (McClure, 2000, p. 3; but cf., Fishback & Kantor, 2000, p. 103–4).

Sources, Knowles (1920, p. 30–4), White (1943, p. 360–1), Ewing (1991, p. 914–5), Fishback and Kantor (2000, p. 103–4), McClure (2000, p. 3), Huberman and Lewchuk (2003, p. 11) and Moses (2018, p. 273–4).

Appendix B.

Pairwise correlation

Table B1. Pairwise correlation of insurance coverage and accident frequency, 1906, 1913 and 1917.

	Insurance share	Accident frequency
Insurance share	1.0000	
Accident frequency	0.1773*	1.0000

Note: * significant at the 1% level; Pearson correlation coefficient.

Source: Kommerskollegie (1908); Socialstyrelsen (1916); Riksförsäkringsanstalten (1921).

Appendix C

Difference-in-Difference analysis of statutory accident provision.

Table C1. Tests for the parallel trend assumption before the implementation of accident insurance in 1918.

	Model
Variables	(1)
4 years before	0.0263 (0.0432)
3 years before	0.0112 (0.0432)
2 years before	0.0300 (0.0432)
1 year before	0.0158 (0.0432)
Constant	0.997*** (0.0102)
Industry and year fixed effects	Yes
Observations	668
R-squared	0.0042

Robust standard errors clustered at the firm level in parentheses.

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.