



# Between voluntarism and compulsion: Membership in mutual health insurance societies in Swedish manufacturing, c. 1900

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## Abstract

Membership in mutual health insurance societies spread among industrial workers in the late nineteenth century. We study determinants of such membership among male workers in Swedish manufacturing by using matched employer–employee data from three industries covering all workers (i.e. members and non-members,  $N > 12\,000$ ) and firms around 1900. We find remarkably high rates of membership overall, and especially among married workers. The association between marital status and health insurance suggests that selection into health insurance societies was ‘propitious’ rather than ‘adverse’. Many workers became members well before the age of 40 years, when their health began to deteriorate, and this coincided with the average age of first marriage for men, occurring in their late twenties. Being married and having membership was more marked in firms with voluntary membership and was important for the viability of the mix of voluntary and compulsory health insurance societies emerging in Nordic countries around 1900. Findings support the idea that health insurance can attract high levels of membership under voluntary schemes and suggest why it took

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so long before statutory health insurance covering sickness absence and workplace accidents was introduced in Sweden.

#### KEYWORDS

linear probability models, manufacturing industry, matched employer–employee data, mutual health insurance, Poisson regression models, Sweden

The increasing reliance on wage work together with the erosion of traditional forms of emergency relief and self-insurance created a demand among workers in industrializing contexts to protect themselves against income loss due to illness and workplace accidents. The organizational principles of health insurance provision for a growing industrial workforce varied between countries.<sup>1</sup> Some countries, including the United Kingdom and the United States, relied on voluntary health insurance societies and every worker's right to decide if they wanted insurance, while other countries, such as the German-speaking countries and France, introduced systems with compulsory membership for certain occupations (such as miners). Sweden and the other Nordic countries represented a third alternative, featuring a mix of voluntary and compulsory health insurance societies partly subsidized by the state.<sup>2</sup>

In the long run, most countries opted for statutory health insurance, but the timing differed. Swedish policy makers, for example, debated the introduction of compulsory health insurance for over half a century. Already in the late nineteenth century, a government inquiry supported the introduction of compulsory health insurance, arguing that those most in need were not voluntarily joining the societies.<sup>3</sup> This argument goes against much of the recent literature on health insurance, which emphasizes the opposite – the over-representation of 'high-risk' individuals (i.e. adverse selection). Nevertheless, Swedish politicians restricted employers' compulsory schemes in 1910 in favour of voluntary schemes until 1955, when general health insurance was introduced.<sup>4</sup> One explanation for the delay in statutory provision is that voluntary health insurance societies managed to reach a large share of Swedish workers, and that this was considered sufficient by the politicians of the day. However, they merely assumed this was the case.<sup>5</sup> The ability to examine empirical evidence on who joined voluntary health insurance societies, and whether voluntary and compulsory membership differed, was limited at the time. In fact, the lack of evidence regarding these aspects persists.

We investigated determinants of membership in voluntary and compulsory health insurance societies among male workers in Swedish manufacturing c. 1900, using matched

<sup>1</sup> Esping-Andersen and Korpi, 'From poor relief'.

<sup>2</sup> There was, however, variation among the Nordic countries. Sweden and Denmark were more influenced by liberal ideas, and hence voluntary health insurance was initially more common in Sweden and Denmark than in Norway and Finland. In early-twentieth-century Finland, voluntary health insurance became increasingly important, while Norway enacted compulsory public health insurance in 1909. Kuhnle, 'The beginnings'; Murray, 'Social insurance claims'.

<sup>3</sup> Johansson, *Fast i det förflutna*, p. 132.

<sup>4</sup> The general health insurance scheme which was implemented in 1955 featured earnings-related benefits and subsidized medical care in case of sickness or workplace accidents. It was primarily funded by social security contributions from employers.

<sup>5</sup> Johansson, *Fast i det förflutna*, p. 137.



employer–employee data providing national coverage of the tobacco, printing, and mechanical engineering industries. The data were compiled from archival records and cover all workers (i.e. members and non-members) and firms in a specific year. Such data are extremely rare for the period but enable analysis of individual-level determinants of membership between and within firms. Being able to account for firm-level heterogeneity is important for this study given the potential salience of the firm whose workers took up membership. In addition to distinguishing between societies in terms of voluntary and compulsory membership, we can examine whether the determinants of membership differed between ‘work-related’ and ‘open’ societies and between joining one or multiple societies.

This study is the first attempt to consider a wider set of determinants for membership in historical health insurance societies. Micro-level analyses of such membership are rare and in the case of the Nordics non-existent, despite these countries being of both interest and relevance given their ambitious statutory welfare policies in later years. The present study furthers our understanding of factors that mattered for membership, and by extension explains how well these societies functioned. It also completes the aggregate picture regarding mutual insurance against sickness and accident with a micro-level analysis focusing on workers and firms. The Swedish case offers a unique opportunity to compare compulsory with voluntary provision at the individual level as the two competing systems evolved side by side. An examination of these has theoretical implications because the selection into compulsory vis-à-vis voluntary insurance is expected to be different. Thus, the contribution this study makes to the literature in economic history is to establish how the mix of voluntary and compulsory societies, signifying one approach to the early organization of health insurance, operated before the introduction of general health insurance.

The following findings are noteworthy: We find remarkably high membership rates across industries, but especially so in mechanical engineering, and among married workers irrespective of industry. Workers of all ages joined health insurance societies – well before the potential onset of health problems. The societies’ egalitarian pricing seems not to have encouraged workers to defer enrolment until they were older. The importance of marital status and the unimportance of age, especially in firms with voluntary membership, suggest that members of the Swedish societies were ‘propitiously’ rather than ‘adversely’ selected.

## I | PREVIOUS RESEARCH AND THEORETICAL CONSIDERATIONS

The existing literature discusses various terms for organizations providing their members with benefits or other support in the case of death, sickness, disability, old age, or unemployment – for example, ‘mutual aid society’ and ‘industrial sickness fund’. In this paper we use ‘health insurance society’.<sup>6</sup> These societies attracted members and became increasingly important in parallel with industrial growth around the turn of the last century.<sup>7</sup> In the United States, membership rose from 25 per cent of those industrial workers surveyed in the early 1880s to 30–40 per cent of non-agricultural workers around 1920. In the United Kingdom in the late nineteenth century, about half of all adult males belonged to a friendly society. Between 1895 and 1905, the number of health insurance society members in Austria, Germany, France, and Belgium increased from 11 to 19

<sup>6</sup> In Sweden, such societies were called *sjukkassor*.

<sup>7</sup> Beito, *From mutual aid*; Edebalk and Olofsson, ‘Sickness benefits’; Emery and Emery, *A young man’s benefit*; Murray, *Origins*; idem, ‘Industrial sickness funds’.



million. In Sweden, 14 per cent of workers in manufacturing and services in 1884 were members, and this share increased to about 50 per cent by 1907.<sup>8</sup>

Although there was strong support in some countries for voluntary principles in health insurance, most industrialized countries in the early twentieth century abandoned such arrangements in favour of statutory welfare provision, such as the National Insurance Act of 1911 in the United Kingdom. The mechanisms behind this shift are debatable. An important piece of the puzzle relates to the individual characteristics and motivations of members voluntarily joining health insurance societies. The arguments for the rise in statutory provision as put forward in the historical literature have been highly influenced by the classic economic–theoretical works on asymmetric information.<sup>9</sup> One reason for expecting information asymmetry in historical sickness insurance societies was their under-developed pricing schemes and lack of actuarial techniques, making them more vulnerable to the problem than were commercial insurers. Unlike commercial insurers, health insurance societies put less effort in differentiating risk among policy holders. Although the societies noted in their records that morbidity claims incidence was higher among older than younger members,<sup>10</sup> they did not implement an effective age-scaled premium scheme, which according to Gottlieb meant workers postponed membership to a higher age.<sup>11</sup> Furthermore, workers in more risk-exposed occupations were charged a premium no higher than for those in less risk-exposed, which led to cross-subsidy between low-risk and high-risk workers.<sup>12</sup> Although observable individual risk profiles differed, an egalitarian pricing policy offered more incentives for older individuals and those in a riskier occupation to join a society.<sup>13</sup>

To solve information asymmetry, health insurance societies drew up both formal (charters and rules) and informal (social) codes. Whether such measures mitigated these problems or other correlated risk relations by applying an egalitarian pricing policy has created a long-lasting debate. Evidence points both ways. Gilbert found that in Great Britain older friendly society members relied on sickness benefits in the absence of a pension.<sup>14</sup> Murray argues in a cross-country study of European economies between 1885 and 1908 that voluntary societies faced a significant disadvantage compared with the compulsory.<sup>15</sup> His account of the morbidity records, showing three times more claims than in the voluntary funds, puts forward adverse selection as a key explanation. By not pricing for the higher morbidity rates among high-risk older members, societies generated a cross-subsidization to the latter from those low-risk and younger. To avoid ageing members threatening their financial viability, the societies needed a steady influx of young and healthy members, and low-risk incumbents had to be dissuaded from leaving.<sup>16</sup> It is argued that the non-actuarial pricing policy and lack of accumulated reserves meant health insurance societies faced long-term financial vulnerability.<sup>17</sup> In the absence of a social security system at a time of increasing longevity,

<sup>8</sup> *Arbetsförsäkringskomitén, Sjuk-och begravningskassor m.m.; Jungenfelt, Löneandelen; Kommerskollegium, Registrerade sjukkassors verksamhet år 1910.*

<sup>9</sup> For example, *Rothschild and Stiglitz*, 'Equilibrium'.

<sup>10</sup> *Harris et al.*, 'Long-term changes'.

<sup>11</sup> *Gottlieb*, 'Asymmetric information'.

<sup>12</sup> *Andersson, Eriksson, and Nystedt*, 'Workplace accidents'.

<sup>13</sup> See also *Emery*, 'Fraternal sickness insurance'.

<sup>14</sup> *Gilbert*, 'The decay'.

<sup>15</sup> *Murray*, 'Social insurance claims'.

<sup>16</sup> *Emery*, 'From defining characteristic'; *Emery and Emery, A young man's benefit.*

<sup>17</sup> *Zeldin, France 1848–1945.*



health insurance became incorporated into workers' pension plans. However, the inability of these societies to provide social insurance protection and the concerns regarding insolvency gave rise to commercial- and government-provided insurance schemes.

Other studies show that health insurance societies did nevertheless manage to mitigate adverse selection through pooling risk among members by age limits, close affinity, and social proximity.<sup>18</sup> Their intrusive monitoring of members and the threat of social exclusion meant that they had an advantage over commercial insurers in mitigating moral hazard.<sup>19</sup> Despite their egalitarian pricing, adverse selection was eased by formal and informal measures. Formal rules such as age limits and age-scaled initiation fees were set to discourage older workers from joining.<sup>20</sup> Various measures for screening healthy individuals were used for admitting new members. Besides undergoing a medical examination they also had to be recommended by incumbents. This gave members a vested interest in protecting their reputation and outlay by selecting the healthiest individuals.<sup>21</sup> Furthermore, Emery has challenged the argument that health insurance societies commonly suffered from insolvency by showing how societies accumulated reserves in their early years of operation to cover higher expenses as members aged.<sup>22</sup>

However, the studies referred to above have mostly relied on aggregated data at society or country level and lack information on individual characteristics such as age, occupation, and family. Without the ability to control for the workers' observable characteristics, any examination of potential information asymmetry is likely to be inconclusive. Although studies of individual societies have provided valuable insights into morbidity, composition, and dynamics among members,<sup>23</sup> we know less about how these differed for non-members. As argued by Gottlieb, the use of individual-level data on both members and non-members can indicate the potential differences between a certain group and the rest of the population and avoid the attendant problem of survival bias when sampling only efficient health insurance societies.<sup>24</sup> Previous studies on the topic have relied on household budget surveys or a sample of either members or non-members of a compulsory or voluntary society.<sup>25</sup> The main advantage of the data employed in this study is that they let us compare workers both with and without membership and show under which scheme, voluntary or compulsory, members were insured. Hence, if the individual characteristics of members voluntarily joining health insurance societies are essential for understanding the selection mechanisms of mutual arrangement, so too is the use of data including both members and non-members.

By applying the basic adverse selection model, one would expect the demand for health insurance to be negatively associated with the price of membership: the higher the price of insurance, the fewer those willing to pay it.<sup>26</sup> However, unlike the standard unit demand model in most product markets, willingness to pay is also linked to cost of cover (benefit payouts), which in

<sup>18</sup> Emery, 'The rise and fall'; idem, 'Risky business?'; Gottlieb, 'Asymmetric information'; Murray, *Origins*.

<sup>19</sup> Gottlieb, 'Asymmetric information'.

<sup>20</sup> Emery, 'The rise and fall'.

<sup>21</sup> Witt, 'Toward a new history'; Andersson and Eriksson, 'Sickness absence'.

<sup>22</sup> Emery, 'Risky business?'.

<sup>23</sup> Castenbrandt, Revuelta-Eugercios, and Torén, 'Differences'; Harris et al., 'Long-term changes'.

<sup>24</sup> Gottlieb, 'Asymmetric information'.

<sup>25</sup> Emery, "'Un-American" or unnecessary?'; Guinnane and Streb, 'Moral hazard'; Kantor and Fishback, 'Precautionary saving'; Murray, 'Social insurance claims'; Saaritsa, 'Informal transfers'.

<sup>26</sup> Chiappori and Gollier, *Competitive failures*; Marquis and Long, 'Worker demand'.



turn is driven by the selection of members into a society.<sup>27</sup> Because a worker's willingness to pay increases with the risk of becoming sick or having an accident, the cost-curve of insurance will slope downward. This holds if those individuals willing to pay the most for coverage are those facing the highest expected cost. If the price is set at an 'egalitarian' (i.e. average) rate whereby all members pay the same premium, the net benefit will be greater for high-risk individuals. If risk is private information, we would expect a positive association between membership and risk factors – that is to say, a negative selection of members into voluntary health insurance societies. Because health deteriorates with age, older workers would, according to the adverse selection hypothesis, have more incentives than younger to join a health insurance society. Moreover, workers with a high risk of having a workplace accident or chronic illness would be more incentivized to take out insurance.

The implication of adverse selection in historical health insurance has, however, been contested empirically by studies showing how health insurance societies managed to mitigate this by imposing formal and informal rules to protect their financial investment. Hemenway pioneered a more conceptual critique towards the assumed presence of adverse selection in insurance markets. His argument of 'propitious selection' or 'favourable selection' takes the totally opposite view on risk selection in insurance markets.<sup>28</sup> He argues that adverse selection might be reversed by considerable risk aversion among low-risk individuals, thus working in favour of the insurer. By applying the propitious selection model, one would expect risk-averse individuals to require insurance more than would high-risk individuals, and to lower the hazard risk in the insurance pool. The model predicts a positive correlation between financial risk-taking and risk-taking in general – that is to say, a propitious selection of members into a voluntary health insurance society.

This means a selection of members recognized as the most prudent, healthy, and well-established workers. Taking out insurance was a way for conscientious male breadwinners to protect their families against unanticipated income losses.<sup>29</sup> In that regard, the selection into health insurance societies may have involved 'cream-skimming', whereby the insurer picked out certain kinds of 'desirable' individuals to become members.<sup>30</sup> We therefore expect that tenured, married workers were more likely to be members of a health insurance society.

## II | UNDERSTANDING HISTORICAL HEALTH INSURANCE: THE CASE OF SWEDEN

Sweden was not among the earliest countries to experience industrialization. Its development lagged behind the United Kingdom and north-western Europe but was ahead of southern Europe,<sup>31</sup> and it benefited from favourable resource endowments and the advantage of the latecomer with respect to technological and organizational advances made elsewhere. Because industrial work often was associated with occupational health and safety risks related to exposure to chemicals, or dust or natural substances (such as lead or nicotine), and to workplace accidents (such as tripping up, slipping, or being caught in moving machinery), workers could join a

<sup>27</sup> Einav and Finkelstein, 'Selection in insurance markets'.

<sup>28</sup> Hemenway, 'Propitious selection'.

<sup>29</sup> Eriksson, 'Beneficiaries or policyholders?'.

<sup>30</sup> Siegelman, 'Adverse selection'.

<sup>31</sup> Crafts, *British economic growth*.



variety of health insurance societies to mitigate such risks. Some societies were open to members from various trades, while others were work-related, and these were tied either to occupation (*yrkeskassor*) or the workplace (*fabrikskassor*). Some societies were connected to trade unions.<sup>32</sup> There were also workplace-based societies with compulsory membership. Although health insurance societies were based on the idea of help-to-self-help and were self-regulated by members, many societies (not only those requiring compulsory membership) had been established and were subsidized by employers. Membership based on occupation, workplace, or locality meant excluding members who had left the trade or workplace or moved outside the area in which members claiming sickness benefit were monitored or visited.<sup>33</sup> Members could exit as they wished but were not entitled to recover any of their membership contributions.

Premium and benefit levels in the voluntary and compulsory health insurance societies were generally similar. Around 1900, premiums relating to the earnings of prime-age adult male workers typically amounted to 1–2 per cent.<sup>34</sup> Many societies could, however, charge their members ex post premiums if needed. The level of sick pay that members were entitled to varied but would typically amount to about 50 per cent of earnings. Few societies offered members support for covering the cost of medicine, doctor's appointments, or hospital stays. That said, many offered burial benefits, amounting to 5–10 per cent of annual earnings, which were probably particularly appealing to male breadwinners. In this respect, there were campaigns that targeted male breadwinners and emphasized their duty to insure and protect their wives and children. The societies' own periodicals often refer to being married as a guarantee of a healthy home environment and an orderly life.<sup>35</sup>

The operation of both voluntary and compulsory societies, including the enrolment of new members, was governed by a set of formal rules (charters) agreed upon by members.<sup>36</sup> Annual fees were not determined by actuarial principles and were thus unrelated to age. To regulate the entry of new members, each society commonly imposed formal restrictions on age, sex, and occupation as qualifications for a certain kind of membership. Typically, age restrictions had a lower boundary of 14–18 years and an upper one of 40–55 years.<sup>37</sup>

The main health insurance societies in the three industries that we explore in this study supplied aggregate information on membership to the Board of Commerce. For printing and mechanical engineering there is information on average number of sick days per member by age, which is of key interest for this study given previous findings on members' ages.<sup>38</sup> Because some societies applied minimum (3–4 days) and maximum (more than 6 months) claim periods, the averages should be considered with some caution, but this will hardly distort the main pattern summarized in figure 1: Morbidity differed little by age for workers in their twenties and thirties,

<sup>32</sup> For example, the Typographers' Union had its own sickness fund as of 1890, but membership was voluntary.

<sup>33</sup> Andersson and Eriksson, 'Sickness absence'.

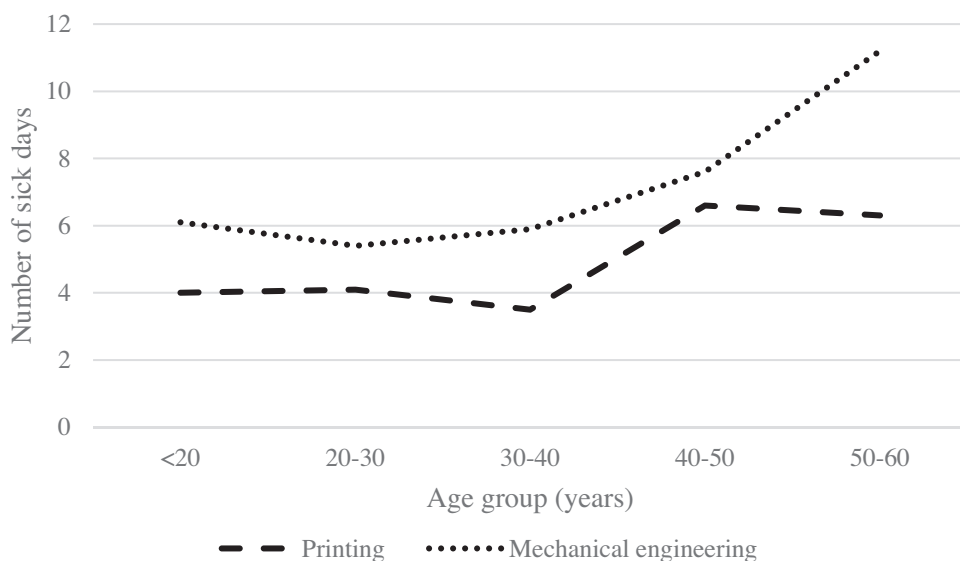
<sup>34</sup> Own calculations based on data from Elmquist, *Undersökning af tobaksindustrin* and *Undersökning af den mekaniska verkstadsindustrien*, and Kommerskollegium, *Undersökning*.

<sup>35</sup> 'Solskenslynne' in *Vårt lif*, 25 November 1905; Eriksson, 'Beneficiaries or policyholders?'.

<sup>36</sup> Lindeberg, *Den svenska sjukkasserörelsen*.

<sup>37</sup> Among the 101 most common health insurance societies in the three industries we investigated, 56 had an upper age limit for becoming a member. Elmquist, *Undersökning af tobaksindustrin*, p. 340; *Undersökning af den mekaniska verkstadsindustrien*, p. 316; Kommerskollegium, *Undersökning af tryckerier*, p. 170. A study based on two Swedish societies shows that most members had joined before they turned 40 years. Castenbrandt, Revuelta-Eurgercios, and Torén, 'Differences', p. 1269.

<sup>38</sup> Average number of sick days was not reported by age in the case of the tobacco industry.



**FIGURE 1** Average number of sick days by age among members of health insurance societies in the printing and mechanical engineering industries. *Source:* Elmquist, 1901, p. 182; Kommerskollegium, 1909, p. 239.

while members over 40 years showed higher morbidity. The average number of sick days was higher in mechanical engineering, especially for those over 50 years.

Compulsory membership may explain why membership was higher in some industries than others. Further reasons why membership differed across industries were the risks regarding workers' health and safety, such as exposure to illness and workplace accidents, and the degree to which employers were engaged in their workers' welfare. Figures on workplace accidents from the Workers' Insurance Committee in 1884/85 (including all accidents irrespective of cause or insurance protection) showed an average risk of 1.6 per 100 workers in manufacturing suffering a workplace accident, meaning a loss of over three working days. The average risk in mechanical engineering was 3 accidents per 100 workers, while the equivalent in tobacco and printing was 0.4 and 0.5 accidents per 100, respectively.<sup>39</sup> As for the more risk-exposed industry of mechanical engineering, more employer-sponsored welfare schemes were introduced here than in the other industries. It was also more common for employers in mechanical engineering to subsidize health insurance for employees. While over 90 per cent of employers in mechanical engineering contributed to health insurance schemes, the equivalent shares in tobacco and printing were only 13 per cent and 6 per cent, respectively.<sup>40</sup>

### III | DATA AND METHODS

From 1880, concern about social and economic issues and the conditions of the growing working classes prompted governments in Europe and the United States to undertake surveys of the

<sup>39</sup> *Arbetareförsäkringskommittén, Olycksfall i arbetet.*

<sup>40</sup> The same proportion of employers in mechanical engineering made contributions to accident insurance, a practice rare in both tobacco and printing. Elmquist, *Undersökning af tobaksindustrin*, p. 128; *Undersökning af den mekaniska verkstadsindustrin*, p. 147; Kommerskollegium, *Undersökning af tryckerier*, p. 143.





industrial workforce and their working conditions. In the 1890s, the Swedish Board of Commerce instigated a series of statistical surveys of workers' conditions across industries in Sweden. To investigate the determinants of health insurance society membership, we exploited cross-sectional data covering three industries and sourced from investigations conducted by the Board of Commerce around 1900. These industries were surveyed nationwide in 1898 (tobacco), 1899 (mechanical engineering),<sup>41</sup> and 1903 (printing). The main motivation originally for these surveys was to gain better insights into working conditions and workers' well-being. There were also particular reasons for selecting these three industries. The working environments in tobacco and printing were known to be particularly unhealthy, and mechanical engineering symbolized the new and highly important industries that posed new accident risks. The location of these industries, which were concentrated to the cities, facilitated the undertaking of the surveys. Health insurance society membership in these three industries was higher than the national average but not very different, especially not for skilled workers in cities. Membership had increased since the early 1880s. In mechanical engineering, 90 per cent of all workers were members (compared with 70 per cent in 1884); in printing, the share was 70 per cent (compared with 46 per cent in 1884); and in tobacco, it was 69 per cent (compared with only 36 per cent in 1884).<sup>42</sup>

The person in charge of these surveys was a statistician, Henning *Elmquist*, who was sent out with his agents to ask detailed questions of all employers and employees concerned, and separate questionnaires were filled in by representatives of the most common health insurance societies in the industries.<sup>43</sup> Information was collected from 4380 workers in the tobacco industry, 7855 workers in printing, and 12 060 workers in mechanical engineering. All workers were interviewed in accordance with a pre-printed, detailed questionnaire covering a range of issues, including personal characteristics, occupation, earnings, and membership in a trade union and/or health insurance society. Most of the questions were open-ended. The agents also collected information from the employers, including workplace and firm characteristics. We can link this rich information in an employer–employee matched dataset.

We carried out separate analyses for male workers based on the industry they were in, allowing for different scenarios in each industry regarding workplace risks and regarding employer support for membership in the relevant health insurance societies. Because some societies applied age restrictions, we restricted samples to workers aged 18–60 years.<sup>44</sup> We excluded those firms employing fewer than 10 workers because these likely had informal insurance practices (e.g. discretionary paternalism on behalf of employer or worker self-insurance) governing workers' health and safety that differed from the formal insurance strategies considered in the surveys. We dropped observations where we lacked information on any of the variables used in the analysis. These iterations reduced our sample to 12 157 workers across 272 firms (906 in 53 tobacco

<sup>41</sup> The 1899 survey of mechanical engineering, as used in this paper, focused on large factories with varied production. A follow-up survey of the same industry in 1901 included smaller and specialized firms.

<sup>42</sup> *Arbetareförsäkringskommittén, Arbetareförsäkringskommitténs betänkande 3 Statistiska undersökningar. Olycksfall i arbetet; Elmquist, Undersökning af tobaksindustrin, Undersökning af den mekaniska verkstadsindustrin; Kommerskollegium, Undersökning af tryckerier.*

<sup>43</sup> The content of these questionnaires reflects the official statistics on health insurance societies, including year of establishment, membership conditions, the wording of the statutes, and economic situation. We used information indicating whether membership was voluntary or compulsory in the workplace.

<sup>44</sup> All health insurance societies admitted members over the age of 18 years, and none excluded members based on a certain age (although some would not accept new members after a certain age). We applied an upper age limit because the societies increased in number during the latter decades of the nineteenth century. This affected the chances of those (of prime working age) in different cohorts joining.

**TABLE 1** Sample characteristics: proportions (%) and means.

	<b>Tobacco</b>	<b>Printing</b>	<b>Mechanical engineering</b>
Member in health insurance society	0.69	0.70	0.90
Worker at firm with compulsory health insurance membership	0.11	0.07	0.52
Age	35.87 (11.88)	31.24 (9.81)	33.29 (11.68)
Married	0.51	0.49	0.56
Children at home	0.47	0.39	0.49
Working in birth location	0.38	0.48	0.32
Good self-rated health	0.80	0.82	0.88
Experience	19.41 (12.06)	15.91 (10.02)	10.77 (9.95)
Tenure	9.68 (10.30)	8.31 (8.28)	7.17 (8.43)
Union member	0.55	0.87	0.43
Weekly income (kronor)	15.24 (4.93)	23.95 (8.24)	15.39 (3.55)
<i>N</i> (workers)	906	2686	8565
<i>N</i> (firms)	53	179	31

Note: Standard deviations in parentheses.

Source: Specialundersökningar Tobaksindustrien 1898, Statistiska avdelningen, HIII b:1 samt HIII b:1 aa vol 1, Kommerskollegiums arkiv, National Archives (*Riksarkivet*), Stockholm; Undersökning av tryckerier m m 1903, Avdelningen för arbetsstatistik, HII a:1 vol 1–6 samt HII a:2 vol 1–12, Kommerskollegiums arkiv, National Archives (*Riksarkivet*), Stockholm; Specialundersökningar Större egentliga mekaniska verkstäder 1899, Statistiska avdelningen, HIII c:1 cc vol 1–14, Kommerskollegiums arkiv, National Archives (*Riksarkivet*), Stockholm.

firms, 2686 in 179 printing firms, and 8565 in 31 mechanical engineering firms). Table 1 presents descriptive statistics of the samples.

#### IV | ANALYTICAL STRATEGY

The empirical analysis consists of two parts: one purely descriptive, focusing on selection patterns among members and non-members across industries, and one multivariate, focusing on the role of individual determinants of health insurance society membership within and between firms. In the multivariate analysis, we first apply linear probability models (LPM) to study the probability of membership (binary outcome).<sup>45</sup> In analysing multiple memberships, we estimate Poisson regressions (suitable for count data). Because we are interested in an unbiased estimation of individual-specific variables, we include firm-specific fixed effects to control for unobserved heterogeneity across firms. The firm fixed effects capture differences in the labour force that may arise from the recruitment of different kinds of labour but also capture differences in

<sup>45</sup> LPM estimates are more straightforward to interpret than those from logit or probit models. It is also more straightforward to compare LPM estimates across sub-samples than is the case for estimates from logit and probit models. For a discussion on the advantages of linear probability models, see Mood 'Logistic regression'.



organizational practices and employer attitudes towards health and safety in the workplace – all of which are important for this investigation.

We focus on a limited set of analytically motivated key determinants and controlled for several additional individual characteristics. In considering the adverse selection and propitious selection models, respectively, we focus on age, marital status, tenure, and income. Control variables include characteristics such as occupation, experience, and self-assessed health. Individual membership in a health insurance society ( $M_i$ ) is modelled as a function of age, marital status, tenure, and other individual-level control variables ( $\mathbf{X}_i$ ), and as unobserved group-fixed effects for individuals working in the same firm ( $G_{ij}$ )<sup>46</sup>:

$$M_i = \alpha_0 + \beta_1 \text{Age}_i + \beta_2 \text{Married}_i + \beta_3 \text{Tenure}_i + \beta_4 \mathbf{X}_i + G_{ij} + \varepsilon_i \quad (1)$$

We estimate all models with and without income to establish if and how income was associated with membership. Our baseline regressions do not differentiate between workplaces in terms of compulsory or voluntary membership, on which basis we estimate separate regressions. For the sample of printing workers, we distinguish between membership in a work-related society and that in an open society, and analyse the determinants of having multiple memberships.

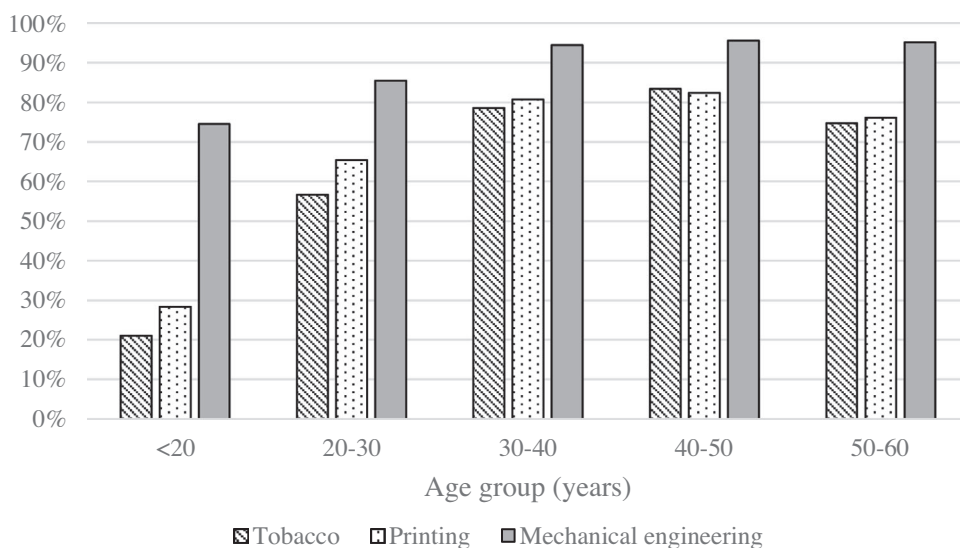
## V | RESULTS

Table 1 summarizes sample characteristics across industries. Most adult male workers were, irrespective of industry, members of a health insurance society, with levels ranging from 70 per cent in tobacco and printing to 90 per cent in mechanical engineering. There was, however, variation in membership between factories: in some cases, it was made compulsory. In tobacco and printing, compulsory membership covered about 10 per cent of workers, while in mechanical engineering it was more common and covered over 50 per cent. Some workers who were not core workers in the trade, such as errand boys and helpers, were exempted from compulsory membership.<sup>47</sup> In mechanical engineering, 92 per cent of those in workplaces with compulsory membership were members, compared with 87 per cent in those where membership was voluntary.

As for individual characteristics of relevance for membership, the typical male worker was in his early to mid-thirties with not only considerable work experience but also a long working life ahead. About half of the workers were married, a finding that makes sense because the mean age of first marriage for men in Sweden was around 27 years (with limited variation according to occupation), and a similar (or somewhat lower) proportion had dependent children in the household. Most workers lived and worked somewhere other than where they were born, indicating that they were internal migrants, especially in the case of mechanical engineering. Most workers in tobacco, printing, and mechanical engineering declared their health status to be ‘good’. Workers in tobacco and printing had on average more experience in their industry than had those in mechanical engineering. Despite this, the experience gained with their present employer varied less across industries, with workers’ job tenure averaging 7–10 years. Union membership varied across industries, being much more common in printing than in tobacco and mechanical

<sup>46</sup> In the equation, individuals are denoted by  $i$  and firms by  $j$ . We also explored the potential relevance of firm-level factors through a vector of such indicators ( $\mathbf{Z}_{ij}$ ).

<sup>47</sup> Lindeberg, *Den svenska sjukförsäkringen*.



**FIGURE 2** Membership in health insurance societies by age in the tobacco, printing, and mechanical engineering industries. *Source:* See Table 1.

engineering. Workers in printing earned significantly more per week than did those in tobacco and mechanical engineering, who had quite similar incomes.

As shown in figure 1, morbidity among workers in printing and mechanical engineering began to increase around the age of 40 years. In considering this it is interesting to look more closely at the relationship between age and membership in the three industries, as provided in figure 2. For tobacco and printing, membership increased with age, from including less than 30 per cent of workers under 20 years to about 60 per cent or more of those aged 20–30 years. Membership plateaued at 80 per cent among workers aged 30–50 years and was somewhat lower among those aged 50–60 years. In mechanical engineering, a high share of members (75 per cent) had already joined when young, and membership was at most around 95 per cent among workers aged 30–50 years.<sup>48</sup> Although there were level differences in membership between tobacco and printing on the one hand and mechanical engineering on the other, figure 2 shows that most workers had joined well before they reached the average age when morbidity began to affect their work capacity and that older members stayed on. The high membership rates among workers of all ages suggests an absence of turnover in membership in a context where both compulsory and voluntary arrangements existed.

Table 2 compares worker's individual characteristics by members and non-members. It demonstrates that workers with health insurance society membership were on average older than non-members, especially in tobacco. Members were also more likely to be married, with the main breadwinner having dependent children, too. Moreover, they had more experience of working in both the industry and the firm in question. Because they were older than non-members, the experience they had might have been equal to age, but their tenure was longer even net of age. Members of health insurance societies were also more likely to be union members. In line with

<sup>48</sup> These shares refer to all workers, but the patterns were very similar among workers at factories requiring compulsory membership.

**TABLE 2** Sample characteristics: proportions (%) and means for non-members and members.

	Tobacco		Printing		Mechanical engineering	
	Non-members	Members	Non-members	Members	Non-members	Members
Age	30.58 (12.42)	38.29 (10.81)	27.95 (9.64)	32.63 (9.55)	26.84 (9.96)	34.05 (11.64)
Married	0.23	0.64	0.30	0.58	0.27	0.59
Children at home	0.21	0.58	0.24	0.45	0.22	0.52
Working in birth location	0.39	0.38	0.51	0.47	0.27	0.33
Good self-rated health	0.83	0.79	0.83	0.82	0.91	0.88
Experience	13.81 (12.97)	21.97 (12.13)	12.46 (9.63)	17.37 (9.83)	4.53 (6.95)	11.50 (9.99)
Tenure	5.94 (8.50)	11.38 (10.60)	5.34 (7.20)	9.57 (8.39)	1.88 (3.97)	7.79 (8.60)
Union member	0.43	0.60	0.80	0.89	0.26	0.45
Weekly income (kronor)	13.31 (5.61)	16.12 (4.31)	20.18 (7.72)	25.54 (7.92)	12.68 (3.43)	15.71 (3.42)
<i>N</i> (workers)	284	622	798	1888	898	7667

Note: See table 1.

Source: See table 1.

these productivity-related differences, members of societies had a higher weekly income than did non-members.

Descriptive statistics indicate positive – not negative – selection into health insurance societies in Swedish manufacturing *c.* 1900. It should, however, be remembered that data are cross-sectional, and thus the average differences between members and non-members reflect to some extent stayer bias in that those who had at some point joined a health insurance society remained members when older. Differences between members and non-members needed to be netted out through multivariate analysis, accounting for individual characteristics as well as firm heterogeneity and sorting on firms with different features.

Turning to the multivariate results, we started by focusing on the associations between individual-level characteristics and health insurance society membership between and within firms. Models 1 and 2 in tables 3–5 explore the determinants of membership between firms, independently and net of income, respectively. We then looked at the same associations within firms (Models 3 and 4), controlling for unobserved characteristics.

To capture possible non-linear relationships between age and membership, we entered age as a categorical variable with workers in their twenties as the reference group.<sup>49</sup> Considering that workers in the youngest age group (<20 years) had not necessarily finished their training or developed a strong occupational identity, we expected that they were less likely to have been members, and considering the correlation between age and morbidity as discussed above (see figure 1), we expected that workers in their thirties and older were more likely to have been so. Tables 3–5

<sup>49</sup> We also tried out specifications using age and age squared, as did Gottlieb, ‘Asymmetric information’. In some of these, the age coefficients were positive, while their squared terms were economically or statistically insignificant.

**TABLE 3** Determinants of health insurance society membership in the tobacco industry 1898.

	Model 1	Model 2	Model 3	Model 4
Age <20 years	-0.265***	-0.201**	-0.204**	-0.147*
Age 20–29 years	Ref	Ref	Ref	Ref
Age 30–39 years	0.054	0.054	0.065	0.064
Age 40–49 years	0.063	0.068	0.071	0.074
Age 50–60 years	0.053	0.074	0.070	0.087
Not married	Ref	Ref	Ref	Ref
Married	0.158***	0.142**	0.136**	0.121**
Poor self-rated health	Ref	Ref	Ref	Ref
Good self-rated health	0.018	0.006	0.017	0.011
Experience	0.004	0.001	0.008	0.006
Tenure	0.019***	0.018***	0.016**	0.017***
Occupation				
Cigar worker	Ref	Ref	Ref	Ref
Sorter	-0.058	-0.085	-0.055	-0.083
Preparation worker	-0.064	-0.046	-0.061	-0.045
Spinner	-0.066	-0.056	-0.062	-0.052
Snuff worker	-0.070	-0.096	-0.036	-0.070
Other	-0.116	-0.142	-0.141	-0.148
Weekly income (kronor)		0.036**		0.032***
Firm-fixed effect			Yes	Yes
Constant	0.345***	0.031	0.360***	0.062
<i>N</i> (workers)	906	906	906	906
<i>N</i> (firms)	53	53	53	53
<i>R</i> <sup>2</sup>	0.26	0.28		
<i>R</i> <sup>2</sup> within			0.25	0.27
<i>R</i> <sup>2</sup> between			0.13	0.16
<i>R</i> <sup>2</sup> overall			0.26	0.27

Notes: Estimates from linear probability models. All models also control for dependent children at home; whether the individual had migrated (i.e. worked in birth location or not); and the squared terms of experience and tenure, whether the individual was a union member or belonged to a temperance organization. Models 2 and 4 also control for the squared term of weekly income. Standard errors clustered at factory level. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Source: Specialundersökningar Tobaksindustrien 1898, Statistiska avdelningen, HIII b:1 samt HIII b:1 aa vol 1, Kommerskollegiums arkiv, National Archives (Riksarkivet), Stockholm.

almost invariably reported negative coefficients for the youngest age group, especially for workers in tobacco and printing. Of note, we found very little difference between workers over 30 years and the reference group. Being married was always positively associated with health insurance society membership across all three industries,<sup>50</sup> though this association was stronger in tobacco

<sup>50</sup> Given the high correlation between marriage and fatherhood, which has been established in previous research, there was no additional impact from having dependent children, though fathers (especially those with young children) were more likely to insure themselves against sickness and accident.

**TABLE 4** Determinants of health insurance society membership in the printing industry 1902/3.

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Age <20 years	-0.206***	-0.158***	-0.193***	-0.134**
Age 20–29 years	Ref	Ref	Ref	Ref
Age 30–39 years	0.006	0.010	0.006	0.015
Age 40–49 years	-0.028	-0.008	-0.025	0.000
Age 50–60 years	-0.049	-0.021	-0.052	-0.029
Not married	Ref	Ref	Ref	Ref
Married	0.133***	0.112***	0.114***	0.100***
Poor self-rated health	Ref	Ref	Ref	Ref
Good self-rated health	0.024	0.016	0.025	0.015
Experience	0.004	-0.001	0.007	0.000
Tenure	0.030***	0.028***	0.023***	0.020***
Occupation				
Compositor	Ref	Ref	Ref	Ref
Printer	-0.084**	-0.075**	-0.079**	-0.070**
Helper	-0.105	-0.076	-0.142**	-0.108*
Bookbinder	0.045	0.064	-0.057	-0.038
Cardboard maker	0.253***	0.287***	0.088	0.114
Weekly income (kronor)		0.009**		0.012***
Firm-fixed effect			Yes	Yes
Constant	0.297***	0.175*	0.342***	0.185*
<i>N</i> (workers)	2686	2686	2686	2686
<i>N</i> (firms)	179	179	179	179
<i>R</i> <sup>2</sup>	0.18	0.19		
<i>R</i> <sup>2</sup> within			0.15	0.16
<i>R</i> <sup>2</sup> between			0.17	0.15
<i>R</i> <sup>2</sup> overall			0.16	0.17

Notes: See table 3. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Source: Undersökning av tryckerier m m 1903, Avdelningen för arbetsstatistik, HII a:1 vol 1–6 samt HII a:2 vol 1–12, Kommerskollegiums arkiv, National Archives (*Riksarkivet*), Stockholm.

and printing than in mechanical engineering. This pattern is potentially related to the fact that, for many workers in mechanical engineering, membership was compulsory. Self-declared health status did not matter for membership. Experience did not matter for it either, though this may be due to a high correlation with age. That said, tenure was positively related to membership across industries, which is what we would expect because sometimes membership required a minimum period spent with a certain employer.<sup>51</sup>

Income is correlated with age, marital status, experience, and tenure as well as occupation. Mature workers earned more than younger, not married, less-experienced peers, especially when

<sup>51</sup> Based on the same reasoning, we would have expected a negative impact of the squared term of tenure, but this was not the case. There is no threshold effect suggesting a specified period of employment required for membership in a (factory-based) sickness fund. The length of time spent with a particular employer is thus not important.

**TABLE 5** Determinants of health insurance society membership in mechanical engineering 1899.

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Age <20 years	-0.066**	0.001	-0.057*	-0.009
Age 20–29 years	Ref	Ref	Ref	Ref
Age 30–39 years	0.005	-0.001	0.000	-0.003
Age 40–49 years	-0.022	-0.019	-0.033*	-0.026
Age 50–60 years	-0.028	-0.018	-0.065**	-0.053**
Not married	Ref	Ref	Ref	Ref
Married	0.038**	0.030*	0.041***	0.033**
Poor self-rated health	Ref	Ref	Ref	Ref
Good self-rated health	0.008	0.003	0.001	-0.001
Experience	0.006	0.001	0.006*	0.003
Tenure	0.014***	0.015***	0.015**	0.015**
Occupation				
Cabinet maker	0.066**	0.031	0.029	0.013
Moulder	0.036	0.023	0.021	0.019
Machine worker	0.024	0.008	0.008	0.002
Machinist	0.054	0.034	0.034*	0.026
Painter	-0.013	-0.045	-0.067*	-0.078*
Sheet metal worker	Ref	Ref	Ref	Ref
Blacksmith	-0.001	-0.006	-0.007	-0.009
Woodworker	0.022	-0.006	-0.005	-0.026
Other	0.013	0.020	-0.010	-0.005
Weekly income (kronor)		0.093*		0.068*
Firm-fixed effect			Yes	Yes
Constant	0.716***	-0.047	0.742***	0.180
<i>N</i> (workers)	8565	8565	8565	8565
<i>N</i> (firms)	31	31	31	31
<i>R</i> <sup>2</sup>	0.11	0.14		
<i>R</i> <sup>2</sup> within			0.12	0.13
<i>R</i> <sup>2</sup> between			0.01	0.06
<i>R</i> <sup>2</sup> overall			0.10	0.13

Notes: See table 3. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Source: Specialundersökningar Större egentliga mekaniska verkstäder 1899, Statistiska avdelningen, HIII c:1 cc vol 1–14, Kommerskollegiums arkiv, National Archives (*Riksarkivet*), Stockholm.

working in the same firm in a context where wages were highly related to individual productivity rather than determined by collective agreement. Income is also relevant for our study because it indicates access to resources and informs us whether health insurance society membership was related to lack of income. Income also indicates what the individual might lose in the case of injury or poor health. When comparing workers within the same firm, we considered sorting on firms based on whether they were high- or low-paying. For these reasons, we estimated models with and without income. Income was consistently positively associated with membership, net of other factors, especially in mechanical engineering. In Model 2, adding income suppressed some





coefficients such as age and marital status in relation to Model 1 estimates, which was in line with older and married workers earning more. Of note, these patterns between firms were highly similar to the patterns within firms (Models 3 and 4), though sorting across firms according to age was more important for workers in the tobacco industry than for those in the other industries.

Heterogeneity across firms may have arisen from the recruitment of different kinds of labour but may also have stemmed from unobserved management practices affecting workplace dynamics of relevance for membership. Controlling for unobserved differences between firms in tobacco, printing and mechanical engineering adjusts the estimates from baseline models (1–2) but also adjusts the estimates from models including controls for some basic, observable firm characteristics such as location and size. We estimated these models as a sensitivity analysis. The same patterns remained across model specifications, but estimates for age and marital status were most suppressed in the fixed effects models, indicating that firm-level practices, which we cannot observe, mattered for membership.

In sum, marital status was a highly important individual-level factor for health insurance society membership around 1900. This finding largely holds across industries, between and within firms, and independent of income. The results for mechanical engineering are somewhat different (i.e. weaker) than those for tobacco and printing. This shows that the industries were different in terms of both production and management and risks – which was of relevance for workers considering membership.

A potentially important firm-level variable, particularly in mechanical engineering, was whether the factory maintained a health insurance scheme requiring compulsory membership. As mentioned, this applied to about half of the workers in mechanical engineering. Table 6 shows estimates for all firms and for those offering only voluntary membership, and reveals some differences between the samples. Of note, the positive association between being married and having membership was much stronger in the sample of firms with voluntary membership. This suggests a causal relationship from marriage to health insurance for the Swedish context, rather than the other way around, as has been discussed regarding the German context, where insurance was compulsory for certain occupations.<sup>52</sup> That married men were more likely to be members, and not the other way around, is similar to the marriage premium in male earnings stemming either from marriage as treatment (productivity-enhancing and associated with responsible living) or from positive selection into both marriage and sickness insurance societies.

The association between tenure and membership is also stronger where membership was voluntary. Sorting is the likely explanation for these features as well as for the positive relationship between income and membership among all those firms, which disappear when we only consider firms with voluntary membership. The results indicate no problems regarding adverse selection even where membership was voluntary.

As mentioned above, there was a variety of health insurance societies that workers could potentially join. For workers in the printing industry, the data allowed us to distinguish between work-related health insurance societies for workers in a particular occupation or at a particular workplace, and open societies which workers from various occupations and workplaces could join. As seen in table 7, this distinction reveals interesting patterns that make sense in the light of theory and the context studied. Whereas age did not matter for membership in a work-related society, it did for membership in an open one. Compared with the reference age group of

<sup>52</sup> Guinnane and Streb, 'The introduction'. Moreover, we tested this association by interacting married and voluntary membership at the firm. This interaction was significant in tobacco and printing, but not in mechanical engineering (likely due to too little variation in the data).

**TABLE 6** Determinants of health insurance society membership, comparing workers in firms with voluntary and compulsory membership across industries.

	Tobacco		Printing		Mechanical engineering	
	Voluntary	Compulsory	Voluntary	Compulsory	Voluntary	Compulsory
Age <20 years	-0.160*	-0.136	-0.137**	-0.095	-0.051	0.017
Age 20–29 years	Ref	Ref	Ref	Ref	Ref	Ref
Age 30–39 years	0.096	-0.008	0.010	0.041	-0.019	0.019
Age 40–49 years	0.092	0.075	-0.003	-0.014	-0.043*	-0.006
Age 50–60 years	0.094	-0.009	-0.031	-0.084	-0.069*	-0.033
Not married	Ref	Ref	Ref	Ref	Ref	Ref
Married	0.115*	0.085	0.097***	0.080	0.059**	0.014
Poor self-rated health	Ref	Ref	Ref	Ref	Ref	Ref
Good self-rated health	0.005	-0.016	0.014	0.032	0.000	0.005
Experience	0.003	0.019	0.002	-0.015**	0.001	0.003
Tenure	0.017***	0.023	0.021***	0.009	0.021**	0.010
Weekly income (kronor)	0.026**	0.080	0.013***	0.001	0.022	0.102*
Firm-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.095	-0.145	0.105	0.811**	0.534	-0.096
<i>N</i> (workers)	809	97	2495	191	4147	4418
<i>N</i> (firms)	50	3	174	5	16	15
<i>R</i> <sup>2</sup>	0.28	0.45	0.17	0.11	0.14	0.15
<i>R</i> <sup>2</sup> within	0.28	0.45	0.17	0.11	0.14	0.15
<i>R</i> <sup>2</sup> between	0.13	0.97	0.16	0.22	0.00	0.27
<i>R</i> <sup>2</sup> overall	0.29	0.42	0.19	0.08	0.11	0.18

Notes: See table 3. Models 2 and 4 also control for the squared term of weekly income. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Source: See table 1.

20–30 years, older workers were more likely to belong to an open society. While workers joined workplace-related societies at a young age, they deferred membership in open societies. Being married was positively related to membership in both types of society, but marital status was more important for membership in open ones.

A common pattern seen regarding both types of society is the association between tenure and membership. While this clearly makes sense for work-related society membership, particularly at the firm level, the positive association between tenure and open-society membership is intriguing and indicates the importance of management practices and social interaction at the firm level, which are hard to observe in terms of choice of health insurance. Together with the fact that age and marital status are more important for membership in open societies, results suggest positive selection into health insurance society membership in printing around 1900.

Not only could workers join various types of health insurance societies, but they could also join more than one. In that way they could insure themselves to a higher degree against income loss. If membership in one society meant that sick pay amounted to 50 per cent of ordinary earnings, membership in additional societies meant that in the case of illness workers could avoid a reduction in income altogether for extended periods. In the case of their death, they could also secure



**TABLE 7** Determinants of health insurance society membership by type of society in the printing industry 1902/3.

	<b>Work-related society</b>	<b>Open society</b>
Age <20 years	-0.064	-0.057
Age 20–30 years	Ref	Ref
Age 30–40 years	0.017	0.088*
Age 40–50 years	0.009	0.154*
Age 50–60 years	-0.023	0.128
Not married	Ref	Ref
Married	0.083***	0.205***
Poor self-rated health	Ref	Ref
Good self-rated health	0.009	0.023
Experience	0.002	-0.023***
Tenure	0.018***	0.017*
Weekly income (kronor)	0.013***	0.009
Firm-fixed effect	Yes	Yes
Constant	0.029	-0.006
<i>N</i> (workers)	2686	2686
<i>N</i> (firms)	179	179
<i>R</i> <sup>2</sup>	0.16	0.20
Mean dependent variable	0.62	0.34

Notes: See table 3. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

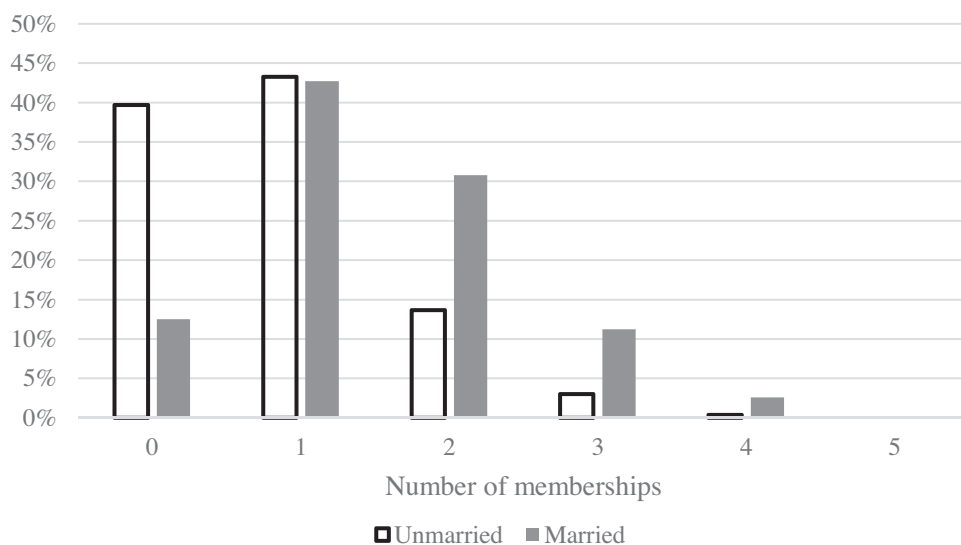
Source: See table 4.

substantial sums for the spouse and other dependents with which to fund their burial and cope with the loss of the breadwinner's income. Multiple membership was common among workers in all three industries, but we only have access to detailed data regarding workers in the printing industry. Figure 3 displays the number of memberships for married and unmarried workers. In printing, 40 per cent of unmarried workers and 13 per cent of married were not members of any health insurance society. The percentages of those belonging to just one society were about equal, but for those belonging to two or more societies they were much lower among unmarried than married men.

To analyse the number of memberships further, we estimated a Poisson regression with firm-level fixed effects. Results from this regression show that the difference between unmarried and married workers was not simply related to age (i.e. married workers being older). Married workers were more likely to have multiple health insurance plans, net of controls. Tenure and income were at least somewhat positively associated with multiple membership, which further supports the positive selection of forward-looking men with breadwinning responsibilities into membership (table 8).<sup>53</sup>

There are limitations to keep in mind regarding the present study. The most important is that we used cross-sectional data. This implies potential problems, such as stayer bias and reverse

<sup>53</sup> Also, union and temperance organization membership were positively associated with multiple membership, net of other controls, which further supports this argument.



**FIGURE 3** Distribution of unmarried and married workers in the printing industry by number of memberships in health insurance societies. *Source:* See Table 3b.

**TABLE 8** Determinants of the number of memberships in health insurance societies in the printing industry 1902/3.

Age <20 years	-0.527**
Age 20–30 years	Ref
Age 30–40 years	0.109
Age 40–50 years	0.131
Age 50–60 years	0.137
Not married	Ref
Married	0.223***
Poor self-rated health	Ref
Good self-rated health	0.023
Experience	-0.009
Tenure	0.032***
Weekly income (kronor)	0.034***
Firm-fixed effect	Yes
Constant	-1.532**
<i>N</i> (workers)	2686
<i>N</i> (firms)	179
LR $\chi^2$ (3)	1175.61
Prob > $\chi^2$	0.00
Pseudo $R^2$	0.17

*Notes:* Results obtained from Poisson regression. See table 3 for information on additional control variables. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

*Source:* See table 4.



causality, which we would not have faced had we had access to longitudinal information (which is unobtainable). We acknowledge this and do not interpret results as causal impacts in any strict sense. Though the data are rich, there may be unobservable, individual-level factors associated with (non-)membership for which we cannot account.

## VI | CONCLUDING DISCUSSION

While most countries in the Western world today have statutory health insurance plans, their systems have evolved in different ways. In some countries, such as Sweden, compulsory systems were preceded by mutual health insurance societies where membership was either voluntary or compulsory. In this paper, we investigated determinants of health insurance society membership among manufacturing workers. Three findings from the present study are important in relation to previous research: These are the high rates of membership overall and in mechanical engineering in particular, the absence of deferred membership, and the importance of marital status.

The high rates of membership show that both voluntary and compulsory health insurance societies could create and maintain safety nets before the welfare state came into being. The remarkably high level of membership among workers in mechanical engineering was not simply due to the prevalence of workplaces requiring health insurance, because membership was almost as high where it was voluntary. High accident risk likely gave workers in this industry strong incentives to insure themselves and to demand that employers subsidize it. Given their problems with said risks and personnel turnover, employers in mechanical engineering also had good reason to pay attention to the workers' well-being.

We found associations between membership and age, but these were mainly differences between very young workers and those over 30 years. We find no support for the argument that the egalitarian pricing of membership meant younger workers deferred enrolment until they were older (and facing higher morbidity), as is suggested in models of adverse selection. We regard the age effect as an indication of occupational identity, not increased morbidity. It was not so much the occupational specialty but rather the identity of belonging to a certain branch of industry which often determined the organization of health insurance societies. As 18–19-year-olds, workers had not necessarily reached the point yet of deciding upon their future career path and were therefore less interested in the variety of health insurance societies that were more or less closely associated with a particular industry. It was when they established themselves in a trade during their twenties that they joined a health insurance society, typically one associated with work rather than one of the many open societies available. From this perspective, an interesting avenue of further research would be to look at the importance of careers and social interaction at the workplace for health insurance membership. Likewise, the roles of temperance organizations and trade unions are worth further study in this regard.

Married workers were consistently more likely than unmarried to belong to a health insurance society. This pattern appears between and within firms, regardless of controls and which sample restrictions we imposed, but is particularly strong in workplaces with voluntary membership. Moreover, married workers were not only more often members of a society but also more likely to have additional memberships, typically in open (not work-related) societies. By adding these memberships, married workers were able to achieve full compensation for income loss in case of sickness or injury to the benefit of their dependents. The generous burial support offered by most societies was a benefit that may have further motivated multiple memberships. Belonging to two or three societies not only helped cover funeral costs but also helped support the surviving



partner and dependents of the male breadwinner. Irrespective of the mechanisms at play behind this (marriage prompting men to be more productive and act more responsibly, or the more productive and responsible men being more likely to marry), the importance of marital status for health insurance fits better with models of propitious rather than adverse selection into membership. The same applies to the tendency for members to have a higher income.

In sum, our examination of individual-level factors does not support the idea that workers deferred membership to a higher age due to non-actuarial pricing schemes, as has been claimed in previous research. Moreover, being married and having membership was more marked in firms with voluntary membership. Results suggest a causal relationship from marriage to health insurance for the Swedish context, rather than the other way around, which is of importance for the viability of the mix of voluntary and compulsory mutual health societies emerging in the Nordics. The findings support the idea that voluntary health insurance schemes can attract high levels of membership and provide reasonable levels of protection against income loss. The present study helps us understand why it took so long before statutory health insurance was introduced in Sweden, and may be of relevance for which key lessons can be drawn for workers' health insurance in contemporary society, especially in emerging markets in industrializing contexts.

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