

# **Compulsory Public Pension and the Demand for Life Insurance: The Case of Sweden**

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## **Abstract**

We employ cost-of-living surveys and business archives to examine the impact of compulsory pension on the demand for life insurance in Sweden from 1884 to 1914 - a period covering the implementation of the first public compulsory old-age pension reform and the take-off of industry life insurance. As predicted from the contemporary literature on crowding-out effects, we find that compulsory pension reduces the demand for life insurance. Our results also show that income was the major driver for life insurance, along with family structure and geographical localization, while dependence on a male breadwinner played a less significant role.

## **Keywords**

Life insurance; Old-age pension; Household; Crowding-out; Sweden

## Introduction

Western countries have implemented a wide range of social insurance programmes since the late nineteenth century. Social security, unemployment insurance, health insurance, old-age pension and other social insurance schemes have mitigated some of the risks and uncertainties of life. The expansion of social insurance has also affected the growth and development of private insurance schemes, precautionary saving and self-insurance.

A large number of studies argue that uncertainty of income expectations is a key explanatory factor for precautionary savings behaviour.<sup>1</sup> Studies on the potential negative effect of social insurance measures on precautionary savings have found evidence of crowding-out effects. Drawing on Feldstein, it may be argued that social security reduced personal savings by 30% to 50%.<sup>2</sup> Cutler and Gruber estimated that roughly 50% to 75% of the increased social coverage imposed by the US Medicaid programme during the years 1987 to 1992 led to a decrease in private insurance coverage.<sup>3</sup> Furthermore, in their micro-based study on US working-class households Kantor and Fishback showed that the introduction of the US workers' compensation in 1910 significantly reduced savings and the demand for private accident insurance.<sup>4</sup>

The impact of government initiative through social insurance programmes may also have signalling effects. Akerlof and Dickens reason that households may find it uncomfortable to reflect on old age and, therefore, tend to make a less correct trade-off between consumption and savings.<sup>5</sup> Compulsory pension schemes give reason to reflect on retirement, and therefore promote the private provision for old age as well. A similar line of

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<sup>1</sup> Leland, 'Uncertainty'; Kimball, 'Precautionary'; Hubbard, Skinner and Zeldes, 'Precautionary'; Ventura and Eisenhauer, 'Saving'.

<sup>2</sup> Feldstein, 'Savings'; idem, 'Social'; idem, 'Capital'.

<sup>3</sup> Cutler and Gruber 'Public'.

<sup>4</sup> Kantor and Fishback, 'Compensation'.

<sup>5</sup> Akerlof and Dickens 'Cognitive'.

argument is that collective pension plans, by promoting some savings for old age, encourage individuals to save more for a decent retirement.<sup>6</sup> In a macro analysis of pensions and savings in the UK for the period 1906-1937, Johnson argues that the working class increased their effort to save when some public pension guarantees were established.<sup>7</sup>

While there is some evidence of crowding-out effects of social insurance on private insurance and savings, other studies stress the potential positive impact of social security on personal insurance and savings. The direction of causality is not a trivial issue. It is of vital importance for understanding not only the impact of social insurance on households' precautionary savings behaviour, but also the development of the private insurance industry and the reallocation of savings in the economy at large. To capture potential crowding-out or signalling effects on a large share of precautionary savings for old age (and dependence) and an industry with important financial intermediate functions, this study focuses on the impact of compulsory pension on life insurance.

In line with previous studies, we assume that the introduction of different types of public insurance coverage might influence the demand of comparable private insurance services.<sup>8</sup> In Sweden, the typical life insurance product at the time of our study both provided for dependents and old age. In 1914, close to 80 % of all life policies (number) were policies with an obvious pension element.<sup>9</sup>

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<sup>6</sup> Katona, *'Private'*.

<sup>7</sup> Johnson, *'Self-help'*

<sup>8</sup> see e.g. Kantor and Fishback *'Compensation'* that analysed the impact of worker's compensation on accident- and life insurance demand and Matteo and Emery, *'Wealth'*, pp. 448-49, viewing social security and worker's compensation as comparable with the services provided by commercial products like life insurance.

<sup>9</sup> The calculation is based on; Sveriges Officiella Statistik, *Försäkringsanstalter*, 1914. The share of policies with a pension element is calculated as the number of Endowment, Pension and Annuity insurance as share of all life insurance policies.

Government pension insurance was introduced in various European countries in the early twentieth century and onwards.<sup>10</sup> The world's first compulsory government pension insurance (CPI) encompassing a country's entire population was introduced in Sweden.<sup>11</sup> Instituted in 1913 (operating from 1914), the CPI enabled all men and women to collect pension both in cases of disability and upon reaching 67 years of age. The CPI was financed by individual (compulsory) savings accounts and a small government guarantee for the less well off.<sup>12</sup>

From a theoretical point of view it cannot be determined beforehand whether the CPI reduced or stimulated the demand for life insurance. To empirically determine the effect, we test the impact of compulsory pension savings on life insurance saving using a sample of 1,058 Swedish urban working-class households included in the 1907/08 and 1913/14 Cost-of-Living Surveys (CLS).<sup>13</sup>

A common problem in examining the impact of general government reforms is isolating effects due to small or non-existent variation in benefits or payments. In this study we have the potential to isolate such effects. Due to differences in the survey periods of the CLS of individual households, one group was paying the first pension fee issued during the last part of July 1914 while another, larger group of households ceased reporting before the first payment. As the time for starting/ending the year-long survey was randomly distributed among the households, we believe that the data provide an opportunity for a clean test of the impact of compulsory pension fees on life insurance savings.

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<sup>10</sup> Lindert, *public*, p 175.

<sup>11</sup> Edebalk, *Välfärdsstaten*; Elmér, *Folkpensioneringen*.

<sup>12</sup> *Svensk författningssamling*, n:r 120

<sup>13</sup> *Levnadskostnaderna i Stockholm, 1907-8; Levnadskostnaderna i Sverige, 1913-14.*

The case of study can be motivated for other reasons as well. Sweden has been regarded as having one of the most comprehensive welfare states.<sup>14</sup> Edebalk argues that one important characteristic of the pre-WWII Swedish welfare state is its universalism, whereby benefits like child support is granted to every family regardless of income.<sup>15</sup> Linder further stresses this universalism as a key to the popularity of the welfare state.<sup>16</sup> According to previous studies, this key feature of the Swedish welfare state of publicly funded insurance aimed at the entire population had its origin already in the 1910s and not, as is often claimed, in events of the 1930s or 1940s.<sup>17</sup>

Several European countries adopted pension insurance aided by the government before the 1920s, but state pension insurance in other countries was conditional, limited to the working classes, voluntary or only for those in urgent economic circumstances. Sweden was the only country that came to introduce an obligatory, public pension insurance that encompassed the entire population regardless of income, criminal record, social group or gender, for when an individual lost the ability to work or reached the age of 67. In a historical context, this CPI provided unique protection against the loss of ability to work and assisted with support in old age. Sweden offers a case in which social insurance early on may have impacted on the development of private insurance.

A number of studies on life insurance in economic history have focused on the relation between self-insurance and private insurance.<sup>18</sup> Less research has focused on the relation between life insurance and social insurance.<sup>19</sup> We believe that a study based on a country

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<sup>14</sup> Lindert, *public*.

<sup>15</sup> Edebalk, *Välfärdsstaten*.

<sup>16</sup> Lindert, *public*.

<sup>17</sup> Edebalk, *Välfärdsstaten*.

<sup>18</sup> Matteo and Emery, 'Wealth'; Andersson, Eriksson and Lindmark, 'Income'.

<sup>19</sup> Leimgruber, *Solidarity*.

with a high profile in social insurance may help to provide knowledge on how the development of private life insurance from an early stage was affected by social insurance.

### **Social versus private insurance**

The importance of traditional mutual organizations and self-insurance arrangements decreased with changing labour market conditions and the increased reliance on wage earnings during the latter part of the nineteenth century in many growing industrial economies.<sup>20</sup> Previous studies on Sweden have shown that wage-labour workers preferred private financial savings to traditional insurance practices (e.g. reliance on offspring and real estate holdings) rooted in the rural peasant community.<sup>21</sup> One could argue that increase in financial savings was the outcome of the transition on the labour market and the emergence of financial institutions that took place during the industrialization phase of the late nineteenth century.<sup>22</sup>

The national insurance market emerged in Sweden in the second half of the nineteenth century. The first domestic life insurance company (*Skandia*) was established in 1855, and in the following years a number of stock and mutual domestic and foreign companies entered the market. By the beginning of twentieth century, 17 domestic and 23 foreign companies operated on the Swedish life insurance market. The growth of the Swedish insurance market in the second half of the nineteenth century played an important financial intermediation role in promoting rapid industrialization and economic development.<sup>23</sup> By the second half of the nineteenth century Sweden's legal infrastructure and system of contractual enforcement was well developed, by the international standards

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<sup>20</sup> Keneley, 'Australian'; Andersson, Eriksson and Lindmark, 'Income'.

<sup>21</sup> Lilja and Bäcklund, 'Sparbeteenden'.

<sup>22</sup> Eriksson, *Insurance*.

<sup>23</sup> Adams, Lindmark, Andersson and Andersson, 'Growth'

of the time.<sup>24</sup> In the early twentieth century the number of policyholders increased rapidly, due in part to the introduction of industrial life insurance, which targeted the growing wage-labour population.<sup>25</sup>

The main life insurance product was endowment insurance followed by whole life insurance and pension/ savings insurance. Children's insurance and annuity were less significant products. The life insurance market was equally divided between industrial life and ordinary life and most of companies were organized along mutual principles. Domestic mutual corporations supplied most of the policies, followed by domestic stock companies and foreign companies.

The industrial life insurance companies supplied most of pension/savings insurance policies. Ordinary life insurance companies were stronger on the whole life insurance market segment. Endowment insurance was divided more equally between ordinary and industrial companies. Mutual companies were relatively stronger on the endowment and pension segment, but less so in whole life. The early ordinary stock companies established during the 19<sup>th</sup> century kept their position on the whole life segments, but were less successful in targeting the growing market for endowment and pension among urban workers. In table 1, the structure of the life insurance market is outlined by number of policies and corporate form.

**[Insert Table 1 here]**

When CPI was introduced, approximately 66% of households were covered by life insurance provided by life insurance companies.<sup>26</sup> But still, the increased reliance on wage

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<sup>24</sup> Hägg, *Institutional*.

<sup>25</sup> Andersson, Eriksson and Lindmark, 'Income'.

work made a large part of the population vulnerable to sickness, disability and old age.

In Sweden, and in other countries such as Germany where programmes insuring accidents, sickness and old-age had been introduced in the 1880s, a growing debate on the issue of the working class and social insurance swept over Europe. According to Lindert, the countries whose social spending increased the fastest from 1880 to 1930 and that introduced social reforms tended to have a high and rapidly growing per capita income, a political voice for the working class, and a relatively large share of the population over the age of 65.<sup>27</sup> The first bill in Sweden proposing old-age pension was raised in 1884 by the liberal politician Adolf Hedin.<sup>28</sup> Beginning in 1890, Sweden began experiencing a strong industrial expansion and universal voting rights for men were introduced in 1911. Furthermore, at the beginning of the twentieth century the Swedish population was the oldest in the Western world. In 1900, the group of those over 65 was around 4% in Britain and Germany. In Sweden the same year, this age group comprised 9% of the total population.<sup>29</sup> The demographic structure in Sweden was highly affected by emigration to United States.

The Swedish CPI of 1913 was the first of its kind. As the first Swedish social insurance, it became a model for later social reforms.<sup>30</sup> One key principle of the Swedish welfare state

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<sup>26</sup> Calculations are based on Statistics Sweden's Population Census (Folkräkningen) and Statistics Sweden's Insurance Inspectorate Report (Enskilda försäkringsanstalter). The approximate figure on household coverage assumes a male-breadwinner model for the saving in life insurance. The figure may over-aggregate the coverage, as the number of households with more than one insurance policy is unknown. Children's insurance is excluded from the calculation.

<sup>27</sup> Lindert, *public*

<sup>28</sup> The concrete result of the bill (Motion AK 1884:11) was the workers'- insurance committee, which was given the task of investigating accident insurance for workers and old-age insurance. However, the committee did also stress the issue of sickness insurance, which resulted in a law in 1891 that regulated already existing sickness funds (Edebalk, *Välfärdsstaten*, p. 47).

<sup>29</sup> Edebalk and Olsson, *Fattigvård*, p 7.

<sup>30</sup> Since 1896, Parliament had deposited 1,400,000 SEK annually in an insurance fund, which reflects that government pension insurance would be introduced sometime in the future (Elmér *Folkpensioneringen*, p. 22). Sweden experienced a reversed social reform, whereby public pension was the first reform introduced. In other

already enacted through the introduction of the 1913 CPI was that of universality.<sup>31</sup>

Apart from some voluntary government pension schemes, the existing CPIs in 1913 consisted of two types. Obligatory, salaried worker's insurance financed by both state and employer (Germany 1889, France 1910 and England 1911), the majority of which included both disability and old-age pension and initially excluded high-income earners and non-employees and their families from benefits. The other type was tax-based, means- or income-tested relief for old people from a certain age (Denmark 1891, New Zealand 1898, Australia 1901 (changed 1908) and England 1908).<sup>32</sup>

The Swedish CPI came to consist of two parts: firstly, a pension financed by the individual's own contributions, which were based on his/her taxable income – the higher the income, the higher the contribution/fee. As the size of this pension was linked to the total value of the contributions the individual had made, it could only assume a socially satisfactory level after he/she had paid into the system for a significant number of years; secondly, a tax-financed, income-based complementary pension intended for those either not covered or inadequately covered by a pension of the first-named type.<sup>33</sup> This pension aimed at removing elderly or disabled persons from poor relief.<sup>34</sup>

Previous Swedish research has investigated why Sweden introduced universal CPI. Elmér has attributed the Swedish CPI to the agrarian structure of the country and the political power of farmers.<sup>35</sup> The strong political power of Swedish farmers disqualified

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countries, normally, compulsory governmental health insurance was the first reform to be introduced, while sickness due to work-related accidents or old age was transferred to working-accident insurance or to public pension insurance (Edebalk and Olsson, *Fattigvård*).

<sup>31</sup> Lindert, *public*; Edebalk, *Välfärdsstaten*. The other principle of the Swedish welfare state is compensation for loss of income. The establishment of CPI came in 1916 to provide the basis for a system of insurance for work-related injury, Edebalk *Välfärdsstaten*.

<sup>32</sup> *Ålderdomsförsäkringskommitténs betänkande. III.*

<sup>33</sup> *Ålderdomsförsäkringskommitténs betänkande. I.*

<sup>34</sup> Edebalk, *Välfärdsstaten*.

<sup>35</sup> Elmér, *Folkpensioneringen*.

public pension insurance models like the Bismarckian one, which encompassed workers only.<sup>36</sup> Edebalk and Edebalk and Olsson further argue that the model was chosen for moving the cost of elderly care to a national pension system, helping reduce local communities' costs for poor relief, which in many cases was a heavy burden due to the unfavourable demographic conditions.<sup>37</sup> Furthermore, it has been argued that the existing tax system (keeping records on individuals' income) facilitated the calculation and collection of pension premiums.<sup>38</sup>

Sweden was one of few countries that introduced an insurance-based system whereby individuals set aside savings almost entirely for their own account.<sup>39</sup> Except for compulsory measures and state provisions for the less well off, CPI closely resembles market-based insurance. Its design was the outcome of a long process (the first bill came in 1884 and the act was issued in 1913). In this process, several actuaries and insurance representatives were engaged in the working committees.<sup>40</sup> The committees presented comprehensive statistical overviews on the composition of the Swedish population and technical forecasts of scenarios with different types of CPI, and finally presented a proposal for a CPI to Parliament and the

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<sup>36</sup> Elmér, *Folkpensioneringen*.

<sup>37</sup> Edebalk and Olsson, *Fattigvård*; Edebalk, *Välfärdsstaten*. According to Edebalk and Olsson, the burden of taxation rose for communities, especially because of the new reform of compulsory elementary schooling, which was financed by local taxes. The pressure of taxation became uneven between communities and the cost for elderly care and poor relief grew heavy in communities struck by urbanization and the emigration of the young workforce. Between the years 1870 and 1900, Swedish net emigration accounted for 670,000 of a population of four million. The public pension insurance became an early attempt to accomplish tax equalization between communities by equalizing the expenses of elderly care (Edebalk and Olsson 2011:1).

<sup>38</sup> Edebalk, *Välfärdsstaten*.

<sup>39</sup> Edebalk and Olsson, *Fattigvård*.

<sup>40</sup> For instance, Edvard Fränckel, member of the board (MB) of the Swedish insurance trade organization; Hugo Gyldeén, MB and actuary of the Thule life insurance company; Otto Printzsköld, MB and actuary, Anders Lindstedt, MB and actuary and Gustav Mittag-Leffler, MB and actuary of the Victoria life insurance company; Sven Palme, MB and Vice President of the Thule life insurance company and Ivar Fredholm, actuary. Data on board members of the Swedish insurance trade organization is collected from; *Försäkringsföreningens Tidskrift*, 1875; idem 1878; *Arbetareförsäkringskommittén* 1884; *Nya arbetareförsäkringskommittén* 1891; *Ålderdomsförsäkringskommittén* 1907.

authorities for consideration.<sup>41</sup> Already in the work by the first committee, active during 1884-1889, important steps were taken towards the formation of the CPI yet to come. The idea that the government pension should encompass the entire population and not only workers or employees was proposed already by the first committee, and came primarily through a proposal prepared by the committee members and actuaries Hugo Gyldén and Anders Lindstedt who were board members of the Swedish insurance association.<sup>42</sup>

The committee also stressed that the Swedish CPI should be based on self-help and relieve people from the degrading dependency on poor relief.<sup>43</sup> Arguments against CPI in Parliament were, on one hand, that it deprived the individual of the freedom to dispose of his/her assets as desired, and on the other hand that it weakened the incentive for thrift and prudence and would result in lower individual savings.<sup>44</sup> However, all three committees argued that experience from primarily Germany indicated that compulsory savings did not restrict the general thrift of the public; therefore, compulsory insurance was preferable.<sup>45</sup>

Although some life insurance representatives accused the state for undermining their business, the Swedish insurance industry did not form an opposition to a Swedish CPI, in contrast to the American insurance industry.<sup>46</sup> Analyses of the two Swedish insurance trade journals *Försäkringsföreningens Tidskrift* and *Gjallarhornet: nordisk försäkringstidskrift*, show

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<sup>41</sup> The first committee was Arbetareförsäkringskommittén, active 1884-1889. The second was Nya arbetareförsäkringskommittén, active 1891-1893, and the third and last was Ålderdomsförsäkringskommittén, active 1907-1912. The proposal by Arbetareförsäkringskommittén was objected to by all authorities where it had been the object of consideration (Elmér *Folkpensioneringen*, p. 20). The second committee responded to the criticism expressed to the first committee, one aspect of which was the high costs. The proposal was made less extensive but was still rejected in Parliament, primarily because it followed the Bismarckian programme and restricted pension benefits to employees (Elmér, *Folkpensioneringen*, pp. 22, 28).

<sup>42</sup> Elmér, *Folkpensioneringen*, p 19; *Försäkringsföreningens Tidskrift*, 1875; *idem*, 1878.

<sup>43</sup> Elmér, *Folkpensioneringen*, p 20.

<sup>44</sup> *Ibid*, p 23

<sup>45</sup> Arbetareförsäkringskommitténs betänkande, no. I, p 43; Nya arbetareförsäkringskommitténs, betänkade I, pp. 40-43; Ålderdomsförsäkringskommitténs betänkande. I, p 50.

<sup>46</sup> Hoffman, *Sickness*; Hoffman, 'Racism'; Weaver, 'Political'; Walker, 'Compulsory'. Researchers have also suggested that the lack of CPI in the U.S. was due to the unique American ideology and/or institutional structures (see e.g. Beland and Hacker, 'Ideas'; Lindert, *public*; Quadagno *Uninsured* and Bundorf and Fuchs 'Health'; Emery 'Un-American' and Weaver 'Political' .

that the life insurance representatives viewed CPI as inevitable.<sup>47</sup> Arguments against government old-age insurance by parts of the American industrial life insurance business were not viewed as realistic in a European context.<sup>48</sup> The belief in the individual's prudence and possibilities was seen as a result of a strong belief in the future of a "young and energetic America" in contrast to the reality of the "ageing Europe".<sup>49</sup> It was also known that voluntary insurance played a larger role in America.<sup>50</sup> The American opposition to CPI was also explained by the fact that the number of people reached by the American private insurance industry was far higher than in any European country.<sup>51</sup>

The Swedish insurance industry sympathized with the belief of the three committees investigating CPI, that public pension insurance would not harm individual thrift, hence neither the demand for life insurance. The insurance industry argued the CPI should have signalling effects and improve the public's awareness of the need for insurance as well as increase the overall demand for voluntary insurance.<sup>52</sup> It was argued that experience from Germany showed that social insurance was no threat to corporate insurance but rather favoured it while it increased prudence among the public, while people financed their own

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<sup>47</sup> The Swedish insurance trade organization *Svenska försäkringsföreningen* was founded in 1875. It came to play an important political role in, e.g., the legislation of the insurance industry (Lindmark, Andersson and Adams, 'Evolution'). Its discussions, articles, etc., were published in its trade journal (*Försäkringsföreningens Tidskrift*), as were statistical records of insurance companies. Both *Försäkringsföreningens Tidskrift* and *Gjallarhornet* discussed issues relating to the insurance industry, and the current opinions stressed in the journals must be seen as representative of a large part of the Swedish insurance industry.

<sup>48</sup> *Gjallarhornet* 1908, no. 22.

<sup>49</sup> *Ibid.*

<sup>50</sup> *Försäkringsföreningens Tidskrift* 1912, p 17.

<sup>51</sup> *Gjallarhornet*, 1908, no. 25; See also Weaver 'Political', pp. 295 and 300, who argues that the need for CPI was relatively low due to political disinterest, and Emery, 'Un-American', p. 77, who argues that the savings rate and budget surplus of wage-earning Americans made compulsory insurance not necessarily a better option than what was already available and affordable through voluntary arrangements.

<sup>52</sup> *Försäkringsföreningens Tidskrift* 1906, pp 168-184; *Försäkringsföreningens Tidskrift* 1893, pp 123-125; *Gjallarhornet* 1906, 21. Among critics of CPI, it was even argued that a positive attitude towards it had become "modern" and a sound scepticism of the idea was met with intolerance and viewed as conservative and reactionary (*Gjallarhornet*, 1908 no. 25).

insurance in principle without state support.<sup>53</sup> It was commonly argued that the ones most in need of insurance were those who did not insure themselves. It was argued that CPI would teach the lower strata to save as well, which in turn would benefit the private insurance industry.<sup>54</sup> Private insurance would benefit in the long run from a population more accustomed to the act of saving, especially as the CPI became modest and needed complementary savings to be sufficient.<sup>55</sup> Still today it is unknown whether the private insurance actors, through their participation in the work towards a Swedish CPI, were right regarding its ability to create signalling effects increasing the savings in private insurance companies.

### **Compulsory pension and demand for life insurance**

Whether social insurance has a signalling effect or a crowding-out effect on private savings, the introduction of compulsory old-age pension can have consequences on life insurance demands, while life insurance normally also provided the policyholders' old age.<sup>56</sup> From a lifecycle perspective, social security may tend to reduce the need for private savings while at the same time it might offset a positive effect on personal savings by encouraging earlier retirement.<sup>57</sup> Since the potential impact of public old-age pension can go both ways, an empirical examination of life insurance demand is applied.

The demand for life insurance can be the outcome of multiple motives. Individual savings can be motivated as a provision for dependants, whereby a breadwinner's life insurance demand is the outcome of the household's demographic structure.<sup>58</sup> In line with the bequest motive, dependants have an interest in the breadwinner taking insurance to

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<sup>53</sup> *Försäkringsföreningens Tidskrift* 1890, pp. 8-15; idem 1884 pp. 72-77; idem 1904 pp. 110-114.

<sup>54</sup> *Försäkringsföreningens Tidskrift* 1906, pp. 168-184.

<sup>55</sup> Elmér, *Folkpensioneringen*.

<sup>56</sup> Johnson, 'Self-help'; Kantor and Fishback, 'Compensation'.

<sup>57</sup> Johnson, 'Self-help'.

<sup>58</sup> Lewis, 'Dependents'.

secure them from the uncertainty of life. Therefore, households relying on one breadwinner income may have a higher demand for life insurance. Indeed, previous studies have found that households with multiple income earners tend to spend less on life insurance.<sup>59</sup>

The behaviour whereby a household accumulates reserves for short-time income losses due to accidents, sickness, unemployment or related conditions (i.e. precautionary savings) may also have an impact on life insurance demand. Kantor and Fishback find that a household's maintaining assets that yield a net income flow reduces the likelihood that the household will save in life insurance.<sup>60</sup> Matteo and Emery also find a negative impact of wealth on the demand for life insurance. It may be argued that life insurance, by assuring human capital, was a means to compensate for the lack of accumulated reserves or wealth.<sup>61</sup>

From a lifecycle perspective, it is believed that individuals accumulate savings during the working years of life in order to finance consumption in older age. Life insurance demand may be expected to occur early in the lifecycle to assure the income stream from human capital. As shown by Lin and Grace, older households tend to use less life insurance to protect a certain level of financial vulnerability than younger households do.<sup>62</sup> They argue that this may be due to the older households' avoidance of the higher price of life insurance or decreasing absolute risk aversion, since a household generally accumulates more wealth as it gets older. A similar result is reported for life insurance savings in Ontario in 1892, where accumulated assets in older-aged households substituted for life insurance.<sup>63</sup> Also in line with theoretical arguments, holding that the relation between human capital size and wealth is a key determinant of life insurance, young wage earners are assumed to demand

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<sup>59</sup> Dunker, 'Expenditures'; Kantor and Fishback, 'Compensation'.

<sup>60</sup> Kantor and Fishback, 'Compensation'.

<sup>61</sup> Matteo and Emery, 'Wealth'.

<sup>62</sup> Lin and Grace, 'Household'.

<sup>63</sup> Matteo and Emery, 'Wealth'.

more life insurance than old wage earners.<sup>64</sup> Aggregating this reasoning to a macro level, one could say that an increase in human capital based income flow in relation to property-based income flow increases the demand for life insurance. A higher reliance on breadwinners' return on human capital, as wage income, and the risk related to that income flow, is also recognized as a driver of life insurance demand.<sup>65</sup>

### **Household demand for life insurance**

To empirically examine the determinants proposed in the previous literature on life insurance demand and social insurance we have employed a data set comprising life insurance saving, economic, demographic and social factors. The data are based on 1,058 urban working-class households collected from two cost-of-living surveys. The first survey was undertaken in Stockholm in 1907/1908 and the second in eight major cities in 1913/1914.<sup>66</sup> In the latter, the survey period started for most households in the summer of 1913 and ended in the summer of 1914. Most household's cease reporting before the first compulsory pension payment in the last part of July 1914. A smaller group (N = 235) of households reported at the time of the first pension payment. When controlling for potential bias in the reporting, we cannot find other than random reasons for the difference in reporting periods, suggesting that there is not a bias in the reporting on pensions.

The selection of households was based on voluntary measures, whereby people from the urban working class were asked to participate. Of all households included, the drop-out rate was 30%. Due to the voluntary selection measures, the sample cannot be regarded as fully representative of the population of working-class households in Sweden. Compared with the population, two significant differences exist. The surveyed households had higher

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<sup>64</sup> Chen, Ibbotson, Milevsky and Zhu, 'Asset'.

<sup>65</sup> Andersson, Eriksson and Lindmark, 'Income'.

<sup>66</sup> Levnadskostnaderna i Stockholm, 1907-8; Levnadskostnaderna i Sverige, 1913-14.

wages, and single-person households were not included in the surveys.<sup>67</sup> Higher wage and larger number of dependants may give an upward bias for life insurance savings in the sample households compared with the working population.

The household kept detailed accounts on income, consumption and savings. Income was reported based on males, females and children and on source of income (work, gifts, interest, provisions). Consumption was divided into 130 different categories and savings was divided into bank, life insurance, compulsory pension and other savings. Taken together, the average income, consumption and savings were 1,882, 1,782 and 100 SEK, respectively, per year and household.

Most households saved in life insurance products (77%). The average amount saved was 35 SEK (of all households). A smaller share of households saved in banks (58%). The average amount of savings was 60 SEK annually (of all households). Savings at home (measured as budget balance) were on the average positive, albeit small. Among the households surveyed, 22% had paid the first compulsory pension fee. The remaining share ceased reporting before the first payment.

In the typical household, most income was generated by male labour work. Domestic work dominated among females. Only a small share of females worked full-time. Labour income from adults, rents and other contributions were also small on average. Of all incomes (labour, capital and other contributions), an average of 90% male wage income (see Table 2). The male breadwinner model was predominant.

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<sup>67</sup> The median male wage in the 1913/14 cost-of-living survey was 20 per cent higher than the average male wage in the manufacturing industry. Calculation based on; Bagge, wage; Levnadskostnaderna i Sverige, 1913-14.

**[Insert Table 2 here]**

The demographic structure differs across the households. The largest household included 12 individuals and the smallest two. The oldest male was 76 and the youngest 24. The average age of males was 37 and of females 36. Most children were less than seven years old (more than one in each household on average), followed by those between seven and 14, and adults (>14 years of age).

The households were in urban areas. Most were in the city of Malmö (21%), followed by Göteborg (18%) and Stockholm (14%).

Table 3 presents a correlation matrix of households' characteristics and saving in life insurance. The matrix shows only households that have life insurance (sample size=731).

**[Insert Table 3 here]**

Life insurance is negatively correlated with pension, indicating a crowing-out effect rather than a signalling effect. Bank savings are on the other hand is positively correlated with life insurance. Fire insurance, indicating value of property holdings, is significant and positively correlated with life insurance. Income is significantly and positively correlated with life insurance. The share of male income is significantly and negatively correlated with life insurance. Household size has no significant correlation with life insurance.

Life insurance is related to the structure of the household. In families with small children (<7 years old) there is a negative and significant correlation with life insurance. In households with older children (7-14 years old), we find a positive and significant correlation

with life insurance. The presence of adults (>14) have no significant correlation with life insurance.

The geographical location of households is correlated with life insurance demand. In Stockholm we find a positive and significant correlation with life insurance savings. For most of the other cities the correlation with life insurance is negative. To fully examine the factors affecting the demand for life insurance, a multivariate approach is applied.

### **Crowding-out effects of compulsory pensions**

As not all households in the sample save through life insurance products we have tested the relationship with a sample selection model. The selection model controls for the potential bias that arises when using non-randomly selected sample.<sup>68</sup> In this paper we apply the Heckman sample selection model.<sup>69</sup>

Table 4 presents the results. In the outcome model we find a significant and negative effect of pension on life insurance savings. In the selection model the impact of pension of insurance is insignificant. The results show that compulsory pension is complementary to life insurance. Pension do not replace life insurance, but rather reduce the amount saved in life insurance products. From the coefficient estimate of the outcome model it can be seen that the crowding-out effects is equal to 6.55 SEK per household and year. Given the average life insurance premium equal to 35 SEK, the crowding-out effects arguably had economic significance for the life insurance industry and the allocation of savings between private and public institutional sectors.

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<sup>68</sup> Greene, *Econometric*.

<sup>69</sup> Heckman, 'Selection'.

[Insert Table 4 here]

The multivariate analysis shows that bank savings do not have a significant impact on life insurance. The previous finding on correlation in table 3 seems to be related to common drivers, as a genuine effect on life insurance cannot be established. A complementary effect can be seen between budget balance and life insurance savings in the outcome model. In households with large domestic savings the life insurance savings are small, and *vice versa*. Households may keep not only financial assets, but also real assets. To account for such effects, we have used fire insurance premiums as a proxy for real assets. The impact of fire insurance on life insurance is positive and significant in the outcome model. The table also shows that the importance of breadwinner's income share has no effect on the life insurance savings, while the presence of older children has a negative impact on life insurance.

## **Conclusion**

Our study of life insurance demand in Swedish urban working-class households in the early twentieth century shows that compulsory pension has a negative effect on life insurance demand. In line with the literature arguing that social insurance crowds out private insurance, we demonstrate a significant reduction in the amount of life insurance savings after the introduction of compulsory pension in 1914. This result is contrary to the expected signaling effect (positive effect of compulsory pension on insurance) and previous studies arguing that the working class increased their efforts to save when some public pension guarantees were established. This result is also the opposite of the advocated signaling effect held by insurance business representatives at the time. Our results show that income, family structure and geographical localization affected life insurance demand, while dependence on a male breadwinner played a less significant role. We cannot find support

for self-insurance among the workers, as accumulated (financial and real) assets had a positive effect on life insurance demand.

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**Table 1. Structure of the life insurance market by policies (number) and corporate form in 1914.**

| Company form    | Whole life insurance | Endowment insurance | Pension / Savings insurance | Children's insurance | Annuity insurance | Total   |
|-----------------|----------------------|---------------------|-----------------------------|----------------------|-------------------|---------|
| Industrial life | 11 525               | 264 218             | 109 631                     | 44 219               | 91                | 429 684 |
| - Mutual        | 7 224                | 184 170             | 80 670                      | 35 451               | 91                | 307 606 |
| - Stock         | 4 301                | 80 048              | 28 961                      | 8 768                | 0                 | 122 078 |
| Ordinary life   | 121 581              | 258 014             | 18 994                      | 13 344               | 13 909            | 425 842 |
| - Mutual        | 46362                | 159469              | 10 357                      | 11657                | 8818              | 236 663 |
| - Stock         | 75 219               | 98 545              | 8 637                       | 1 687                | 5 091             | 189 179 |
| Foreing life    | 6 591                | 8 667               | 896                         | 514                  | 515               | 17 183  |
| Total           | 139 697              | 530 899             | 129 521                     | 58 077               | 14 515            | 872 709 |

Note: Whole life [Livförsäkring för livstiden] pays a set amount to the beneficiary whenever the insured dies. Endowment insurance [Blandad liv- och kapital försäkring] pays to the insured at a certain age (e.g. retirement) or to the beneficiary if the insured dies before. Pension/Savings insurance [Livförsäkring med bestämd utbetalningstermin] pays to the insured at a certain age. Children's life insurance [barn försäkring] policies provide cover for the child's parent for a specified term. Annuity insurance [Ränteförsäkring] provide payments to the insured at specified age or to a beneficiary (if the insured dies or at a certain age).

Source: Sveriges Officiella Statistik, Enskilda försäkringsanstalter [Swedish Official Statistics, Private Insurance], 1914

**Table 2. Variable definitions and descriptive statistics of households.**

| Variable | Definition  | mean  | Median | Min     | max     |
|----------|---|-------|--------|---------|---------|
| LIS      | Life insurance premium paid, SEK                          | 34,94 | 28,37  | 0       | 377,49  |
| PENS>0   | 1 if family member has paid pension premiums, 0 otherwise | 0,22  | 0      | 0       | 1       |
| BANK     | Bank saving, SEK  | 60,57 | 6,23   | 0       | 1906,55 |
| FI       | 1 if households has fire insurance, 0 otherwise           | 0,69  | 1      | 0       | 1       |
| BUD      | Budget balance (income-expenditures), SEK*                | 1,57  | 0,20   | -944,82 | 692,44  |
| INC      | Total Income (all family members), SEK                    | 1882  | 1798   | 940     | 5139    |
| INCM     | Income share of male, per cent                            | 87,94 | 91,85  | 0       | 100,00  |
| HOS      | Number of family members                                  | 4,41  | 4      | 2       | 12      |
| AGE      | Age of male, years  | 37,16 | 36     | 24      | 76      |
| CHI>14   | Number of children older than 14                          | 0,29  | 0      | 0       | 5       |
| CHI7-14  | Number of children between 7-14                           | 0,98  | 1      | 0       | 5       |
| CHI<7    | Number of children younger than 7                         | 1,14  | 1      | 0       | 6       |
| STHL     | 1 if living in Stockholm, 0 otherwise                     | 0,14  | 0      | 0       | 1       |
| UPPS     | 1 if living in Uppsala, 0 otherwise                       | 0,07  | 0      | 0       | 1       |
| ESKI     | 1 if living in Eskilstuna, 0 otherwise                    | 0,06  | 0      | 0       | 1       |
| JONK     | 1 if living in Jönköping, 0 otherwise                     | 0,08  | 0      | 0       | 1       |
| MALM     | 1 if living in Malmö, 0 otherwise                         | 0,21  | 0      | 0       | 1       |
| HALS     | 1 if living in Hälsingborg, 0 otherwise                   | 0,10  | 0      | 0       | 1       |
| GOTH     | 1 if living in Gothenburg, 0 otherwise                    | 0,18  | 0      | 0       | 1       |
| VAST     | 1 if living in Västerås , 0 otherwise                     | 0,06  | 0      | 0       | 1       |
| GAVL     | 1 if living in Gävle, 0 otherwise                         | 0,08  | 0      | 0       | 1       |
| N obs    | Number of observed households                             | 1058  |        |         |         |

Note: SEK denotes the national currency [Kronor]. 1 SEK= 3.75 \$ in 1913.

Source: Levnadskostnaderna i Stockholm 1907-1908 [Cost-of-Living Survey in Sweden 1907/08], Statistik kontoret.

Levnadskostnaderna i Sverige 1913-1914 [Cost-of-Living-Survey in Sweden 1913/14], del III, Hushållsräkenskaper, Socialstyrelsen].

**Table 3. Correlation matrix, full sample (panel A) and households purchasing life insurance (panel B)**

|              | [1]    | [2]    | [3]    | [4]    | [5]    | [6]    | [7]    | [8]    | [9]    | [10]   | [11]   | [12]   | [13]   | [14]   | [15]   | [16]   | [17]   | [18]   | [19]   | [20]   | [21] |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| LIS          | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [1] PENS>0   | -0,05* | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [2] BANK     | 0,05*  | 0,1*   | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [3] FI       | 0,11*  | 0,06*  | 0,07*  | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [4] BUD      | -0,05* | 0,00   | 0,37*  | 0,00   | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [5] INC      | 0,34*  | 0,05*  | 0,27*  | 0,12*  | 0,23*  | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [6] INCM     | -0,03* | 0,02   | -0,03* | -0,04* | -0,04* | -0,29* | 1      |        |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [7] HOS      | 0,01   | -0,1*  | -0,12* | -0,03* | -0,15* | 0,23*  | -0,18* | 1      |        |        |        |        |        |        |        |        |        |        |        |        |      |
| [8] AGE      | 0,08*  | -0,01  | 0,04*  | 0,06*  | -0,03* | 0,27*  | -0,34* | 0,3*   | 1      |        |        |        |        |        |        |        |        |        |        |        |      |
| [9] CHI>14   | 0,01   | 0,00   | 0,01   | 0,06*  | -0,03* | 0,33*  | -0,47* | 0,41*  | 0,54*  | 1      |        |        |        |        |        |        |        |        |        |        |      |
| [10] CHI7-14 | 0,04*  | -0,08* | -0,09* | 0,02   | -0,16* | 0,19*  | -0,11* | 0,75*  | 0,36*  | 0,15*  | 1      |        |        |        |        |        |        |        |        |        |      |
| [11] CHI<7   | -0,03* | -0,08* | -0,11* | -0,1*  | -0,06* | -0,07* | 0,14*  | 0,54*  | -0,27* | -0,18* | 0,01   | 1      |        |        |        |        |        |        |        |        |      |
| [12] STHL    | 0,07*  | -0,2*  | -0,06* | -0,08* | -0,06* | 0,2*   | -0,01  | 0,00   | -0,02  | 0,00   | 0,02   | -0,03* | 1      |        |        |        |        |        |        |        |      |
| [13] UPSS    | -0,01  | -0,13* | -0,02  | 0,03*  | 0,06*  | -0,06* | 0,06*  | -0,05* | -0,04* | -0,03* | -0,05* | -0,01  | -0,11* | 1      |        |        |        |        |        |        |      |
| [14] ESKI    | -0,04* | 0,34*  | 0,06*  | 0,07*  | 0,04*  | 0,05*  | 0,00   | -0,02  | 0,00   | 0,03*  | 0,01   | -0,07* | -0,1*  | -0,08* | 1      |        |        |        |        |        |      |
| [15] JONK    | -0,09* | -0,12* | -0,03* | -0,11* | 0,00   | -0,15* | -0,01* | 0,07*  | 0,03*  | 0,08*  | 0,00   | 0,06*  | -0,12* | -0,09* | -0,08* | 1      |        |        |        |        |      |
| [16] MALM    | -0,03* | 0,56*  | 0,02   | -0,02  | -0,05* | -0,03* | 0,02   | -0,07* | -0,08* | -0,08* | -0,08* | 0,02   | -0,2*  | -0,15* | -0,13* | -0,15* | 1      |        |        |        |      |
| [17] HALS    | -0,01  | -0,16* | 0,05*  | 0,00   | 0,01   | -0,07* | -0,11* | 0,04*  | 0,05*  | 0,01   | 0,08*  | -0,03* | -0,13* | -0,1*  | -0,09* | -0,1*  | -0,17* | 1      |        |        |      |
| [18] GOTH    | -0,03* | -0,17* | -0,01  | 0,07*  | 0,05*  | 0,03*  | 0,00   | 0,02   | -0,03* | 0,00   | -0,02  | 0,05*  | -0,18* | -0,13* | -0,12* | -0,14* | -0,23* | -0,15* | 1      |        |      |
| [19] VAST    | 0,00   | -0,13* | 0,01   | 0,02   | 0,05*  | -0,01  | 0,01   | -0,01  | 0,02   | -0,03* | -0,03* | 0,04*  | -0,1*  | -0,08* | -0,07* | -0,08* | -0,13* | -0,09* | -0,12* | 1      |      |
| [20] GAVL    | 0,13*  | -0,1*  | -0,03* | 0,04*  | -0,05* | 0,02   | 0,04*  | 0,04*  | 0,11*  | 0,05*  | 0,08*  | -0,05* | -0,13* | -0,1*  | -0,09* | -0,1*  | -0,17* | -0,11* | -0,15* | -0,09* | 1    |

Source: Levnadskostnaderna i Stockholm 1907-1908 [Cost-of-Living Survey in Sweden 1907/08], Statistik kontoret.

Levnadskostnaderna i Sverige 1913-1914 [Cost-of-Living-Survey in Sweden 1913/14], del III, Hushållsräkenskaper, Socialstyrelsen].

**Table 4. Multivariate analysis of public pension impact on life insurance**

| Variables | Outcome model |     | Selection model |     |
|-----------|---------------|-----|-----------------|-----|
| PENS>0    | -6.547087     | **  | -.0656879       |     |
| BANK      | -.0034714     |     | -.0000498       |     |
| FI        | 4.543412      | *   | -.0050838       |     |
| BUD       | -.03285       | *** | -.0005336       | *   |
| INC       | .0274403      | *** | .0005699        | *** |
| INCM      | 7.161675      |     | .3432819        |     |
| AGE       | .5422723      | **  | -.0259509       | *** |
| CHI>14    | -8.452576     | *** | .0480453        |     |
| CHI7-14   | -2.788315     | **  | .0549891        |     |
| CHI<7     | -.9603808     |     | .0476131        |     |
| STHL      |               |     | -1.038421       | *** |
| UPPS      |               |     | -.5115896       | **  |
| ESKI      |               |     | -.7007074       | *** |
| JONK      |               |     | -.5500761       | *** |
| MALM      |               |     | -.7302205       | *** |
| HALS      |               |     | -.5868537       | *** |
| GOTH      |               |     | -.8486789       | *** |
| VAST      |               |     | -.644514        | *** |
| GAVL      |               |     |                 |     |
| Constant  | -17.82225     |     | .7036247        |     |

Note: \*\*\*, \*\*, \* denotes significance at the 1%, 5%, and 10% level respectively.

Note: PENS>0 denotes if family member has paid pension fee, BANK is amount bank saving, BUD is budget balance, INC is total income, INCM is the male income share, AGE is the age of male, CHI>14 is Number of children older than 14, CHI7-14 is the number of children between 7-14, CHI<7, is the number of children younger than 7, STHL denotes families living in Stockholm, UPPS denotes families living in Uppsala, ESKI denotes families living in Eskilstuna, JONK denotes families living in Jönköping, MALM denotes families living in Malmö, HALS denotes families living in Hälsingborg, GOTH denotes families living in Göteborg, VÄST denotes families living in Västerås, GAVL denotes families living in Gävle.

Source: