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SAVING MOTIVES AND THE EFFECTIVENESS OF TAX INCENTIVES – AN ANALYSIS BASED ON THE DEMAND FOR LIFE-INSURANCE IN GERMANY

Mathias Sommer

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L13, 17_D-68131 Mannheim_Phone +49 621 181-2773/1862_Fax +49 621 181-1863_www.mea.uni-mannheim.de

Savings motives and the effectiveness of tax incentives – an analysis based on the demand for life insurance in Germany*

Mathias Sommer†

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Abstract

We exploit data on German households' savings in life insurance products, the characteristics of life insurance products and the specific tax treatment of savings in life insurance products to assess the importance of different savings motives and the effectiveness of tax incentives. Our insights about the determinants of the demand for life insurance products also allow a broad assessment of the possible consequences from the recent reforms of the pension system and of the tax treatment of life insurance policies.

Socioeconomic and institutional factors generate substantial variation within the population and over time, e.g. in the replacement rates of the public pension system and the household tax rates, which allows us to disentangle savings motives and the effects of tax incentives from other factors. We employ a number of indicators for the different savings motives. Further, based on

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† MEA – Universität Mannheim; *Email*: sommer@econ.uni-mannheim.de

the specifics of the German tax law and the richness of our data we are able to generate a unique measure of possible tax savings associated with savings in life insurance products.

We find support for our hypothesis that savings in life insurance products may substitute for a low replacement rate in the public pension system. Only high income households who face lower replacement rates from the public pension system do not increase their demand for life insurance products. Further, we use several measures for a possible bequest or family insurance motive. Our evidence on the relevance of such savings motives is mixed like the existing literature. The presence of a family increases the demand for term life insurance but households with children do not accumulate higher levels of life insurance wealth. Further, some income inequality within a couple increases the likelihood to save in life insurance. The effects are not increasing in the degree of income inequality though and only partly significant. Finally, we find households with high tax rates to be more likely to invest in life insurance products, indicating that the tax free interest earnings from a long term insurance contract play a strong role in households' choice to invest in life insurance. The possibility to deduct contributions from taxable income turns out to be no incentive to save in life insurance products.

Keywords: tax incentives, savings motives, bequests, life insurance

I. Introduction

Life insurance traditionally plays an important role in Germans' private savings. Roughly 60 percent of all German households held some kind of life insurance in 2003. Its popularity might seem somewhat unusual from an international perspective. Yet life insurance products in Germany have some key characteristics, which are not common to life insurance in many other countries. The combination of characteristics also makes the German insurance market an interesting field for research on savings behavior and savings motives: old age provision, tax favors, protection of one's family against income risks, bequest motives and the wish to acquire a piece of real estate may induce people to invest in some kind of life insurance products. We exploit the remarkable aspects of the German insurance market in order to test, which of these determinants actually drive the demand for life insurance and shed some light on the importance of different savings motives.

As of today, most Germans would probably think of a life insurance policy as a means of private old age provision. But there is more to it: annuity insurance and whole life insurance contracts in Germany essentially combine the insurance against longevity risk with a highly tax favored savings plan. Hence, pure tax savings motives as well as the need for additional old age provision in the face of declining generosity of the public pension system may drive the demand for life insurance. Further, life insurance contracts can aim at the insurance of the owner's family against an early death of the main earner or serve a bequest motive. Last, also the possibility to use life insurance contracts as collateral to home loans added to the popularity of annuity and whole life insurance contracts. Some term life insurance is frequently required for a successful application for a home loan.

Our paper contributes mainly to two threads of research: the importance of tax incentives for household savings and portfolio choice and the relevance of savings motives in savings decisions. But also the demand for life insurance itself has attracted some attention in the past. Given that life insurance products have such extraordinary relevance for German households our dataset seems well suited to add some insights.

A substantial literature has discussed the importance of tax incentives and after-tax returns on portfolio choice. The first paper to empirically document the importance of taxation on portfolio choice has been Feldstein (1976). Later, the favorable tax treatment of IRAs and 401(k) plans in the United States triggered a scientific debate on whether or not the tax incentives created additional savings or just crowded out other forms of savings. The literature is summarized by Poterba, Venti and Wise (1996) as well as Engen, Gale and Scholz (1996). While this literature

remains somewhat undecided on whether or not tax incentives are suited to create additional savings it largely agrees that tax incentives shift households' investment decisions in the expected direction. Jappelli and Pistaferri (2001) analyze the effects of a change in the tax treatment towards life insurance products in Italy. Unlike the American studies they do not find evidence for a reaction in household portfolio behavior.

Also the question whether or not bequest motives play a role for private households' savings decisions has received a great deal of attention: The majority of analyses test implications of a bequest motive on consumption or on the demand for term life insurance and private pensions. Bernheim (1991) focuses on the demand for life insurance, while Hurd (1987, 1989) analyzes total savings. Both make use of the Longitudinal Retirement History Survey. Lacking data on surrender values, Bernheim focuses on insurance sums. He concludes that households would not choose to annuitize their entire wealth even in the presence of perfect insurance markets. Instead, a large segment of the population behaves according to what the presence of a bequest motive would imply. His findings are at odds with the conclusions of Hurd (1987), who investigated the rate of asset decumulation of elderly households. Hurd's estimates show no significant differences in the degree of dissaving between households with and without children. While the childless have less reason to save in order to leave a bequest, the weaker family insurance may call for a stronger precautionary savings motive, offsetting the smaller bequest motive. Hurd (1989) uses a parametrized model of consumption and saving: he estimates the marginal utility from bequests to be close to zero. The most recent contribution stems from Kopczuk and Lupton (2005): they relax Hurd's distinction between households with and without children and estimate the existence of a bequest motive using a switching regression. They find the bequest motive to be prominent among all households, no matter whether they have children or not. For a significant share of households, the bequest motive is also estimated to be economically significant. Yet, all these studies suffer from the impossibility to distinguish an operative bequest motive from other savings motives – e.g. precautionary savings motives. Some studies therefore exploit survey data containing direct questions on the intention of leaving a bequest. Alessie et al. (1999) find only insignificant effects of intended bequests on savings for the Netherlands. But also the sign of the estimated effect is not robust across the different years. Kazarozian's (1997) also does not find evidence for a bequest motive. His estimates for the United States have a consistently positive sign but none of them is significant. Laitner and Juster (1996) make use of the TIAA-CREF survey and find households with a bequest motive to have significantly higher wealth levels at age 65. At the same time, they find a large amount of heterogeneity among these households and point out that other household characteristics seem to be more important than the existence of a bequest motive. The sample of TIAA-CREF annuitants is also known to be

not representative for the US population and consisting of rather high educated and well off persons. Juerges (2001) compares subjective and objective indicators for the importance of a bequest motive in Germany. Like Hurd (1987) he finds the presence of children to be of minor importance for heterogeneity in wealth holdings, whereas differences in declared bequest intentions are associated with significant shifts in wealth holdings. Similarly, Schunk (2007) finds that there is a significant bequest motive for older households, even when he controls for the presence of a precautionary motive. While the evidence for a bequest motive remains at best ambiguous, it still remains unclear, whether egoistic or altruistic aspects are causing people to plan to leave a bequest.

Last but not least there is a considerable literature which has focused on specific aspects in the demand of life insurance. Gandolfi and Miners (1996) argue, that there might be differences in the determinants of the demand for life insurance between husbands and wives and find support for their hypotheses. Chen, Wong and Lee (2001) describe the historical trends in the demand for life insurance in the U.S. They find differences in the historical sales between women and men and argue that labor force participation might be an important determinant. Like in Germany, they find a reduction in life insurance purchases over the last years, which is especially prominent among the young. They speculate the higher share of single households and the trend towards later marriages and later childbirth to be the main causes.

Given that we observe a considerable amount of change on the German insurance market we aim to exploit our results to also shed some light on the past – and possible future – trends. Recent changes in the tax legislation and the pension reforms are likely to affect demand in the short and medium run. Over a longer horizon also sociological developments are likely to play a role: Between the 1970s and today we have observed trends to later household formation, later childbirth and higher female labor force participation which are likely to continue over the next decades.

The paper is structured as follows. We start out in section two with an overview over the German market for life insurance products and illustrate the relative importance of the various products with recent data. Further, we describe in detail the subsidization scheme. Section three discusses the theoretical foundations of the demand for life insurance and derives hypotheses about the effect of various savings motives on the demand for life insurance. In the fourth section we describe the data we use for the empirical part, the results of which are presented in the following section. We begin the fifth section with a description of the historical developments and some basic regressions of ownership decisions for the various life insurance products. Bernheim (1991) presented strong evidence, that different processes are driving the ownership

decision and the decision, how much to invest in life insurance. We therefore also employ a two stage model for the households' demand for life insurance. Section six concludes.

II. Life Insurance in Germany

Part of the story about life insurance in Germany is a historical one: capital accumulation on behalf of private households was one of the main political objectives in Germany after the Second World War. To promote this, public economic policy widely employed tax incentives. Hence, life insurance contracts have been designed to meet the requirements for the favorable tax treatment. Apart from a rather attractive combination of reasonably high returns and low levels of risks, these tax advantages will certainly have contributed to the high popularity of savings in life insurance products in Germany. With the stock market boom in the late 1990s the popularity of life insurance products has suffered, but wealth in life insurance products remains to be one of the most important components of German households' financial assets. In 2003, roughly 60 percent of all German households held at least one life insurance contract and wealth in life insurance products accounted for as much 27.5 percent of total financial wealth.

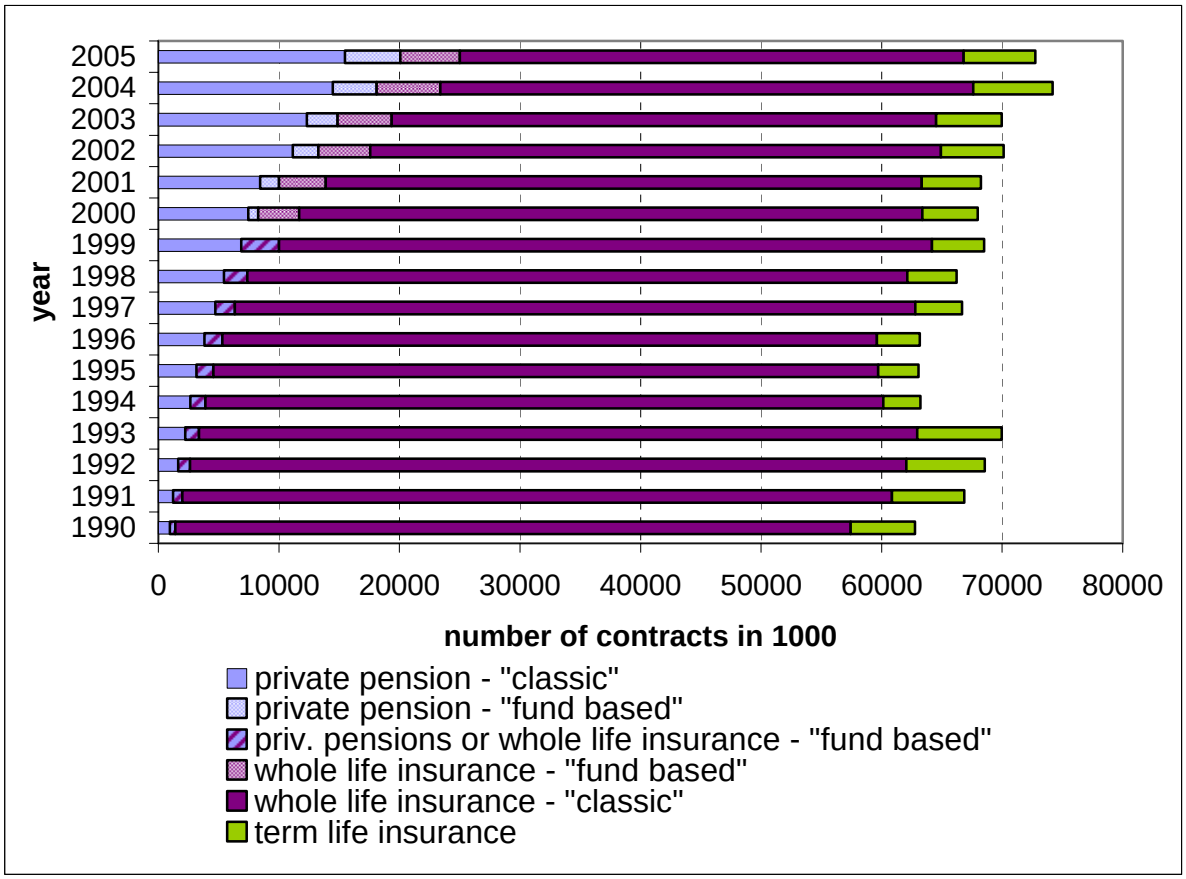
II.1. *Types of life insurance*

The German market for life insurance products spans term life insurance, as well as whole life insurance and private pensions. The first is distinct from the other two, as it does not involve capital accumulation. We still consider it in our analysis, as term life insurance can still be employed to insure the family against income risks connected to the death of the main earner. Among the other two, whole life insurance and private pension contracts theoretically define quite distinct products. Yet, the way they are offered on the German market, they differ only in a few aspects. They both essentially combine an insurance against longevity risk with a highly tax favored savings plan. The main difference is that whole life insurance contracts come with a term life component whereas private annuities do not. Among these two capital accumulating products we distinguish so called "classical" and "fund based" contracts. In a "classical" insurance contract, the insured person is guaranteed a minimum annual return. The insured further participate in excess returns of the insurance company. The key characteristic of the "fund based" contracts is that the insured person essentially bears the risk of return. The classical and fund based contracts differ somewhat on behalf of their tax treatment, which we will discuss later.

Looking at the historical developments on the German insurance market, we observe that in the early 1990s essentially only term life insurance and classical whole life insurance contracts played a role. Over the last fifteen years, two trends have changed the structure of the market. First,

fund based insurance contracts have experienced a considerable growth (see figure 1). Second, private pensions have gained substantial importance. These impressive changes happened over a time span of only 15 years. The dynamics are even more striking when looking at the number of newly signed policies. Since the year 2001 newly signed private pension contracts make for at least 50 percent of total new contracts.[1] Note that these trends coincide with a number of reforms to the German public pension system.

Figure 1: Number of life insurance contracts by type of product (in 1000)



Source: Gesamtverband der Versicherungswirtschaft

These aggregate figures already give us a broad impression of the importance of life insurance products in German household portfolios. The total of roughly 70 million contracts relates to a population of 82 million people in 39 million households, a lot of which hold several insurance contracts. The 2003 Income and Expenditure Survey (EVS) allows us to inspect ownership rates and portfolio shares of the different types of products: Whole life insurance contracts turn out to be part of financial wealth in every second German household (see Table 1). The EVS also allows

[1] excluding pure term life insurance

us to distinguish certain special types of whole life insurance: specifically there are death benefit insurances, apprenticeship insurances, and trousseau insurances. They are all connected to certain events for their payout but differ rather little from regular whole life insurance policies and also share the same requirements to receive the favorable tax treatment. Yet these special types of whole life insurance have lost most of their previous importance: in 2003, trousseau insurance and apprenticeship insurance were held by only 1-2 percent of all households. 6.4 percent owned a death benefit insurance contract.[2]

Looking at the surrender values of life insurance contracts, we find them to make up for a substantial share of total household financial wealth.[3] The conditional wealth levels and conditional portfolio shares illustrate the substantial importance of life insurance wealth for those households who actually had some money invested in the various kinds of policies. Note that private pensions also make for an important share of financial wealth for their owners, but still play only a minor role in the aggregate portfolio of all German households.

Table 1: Ownership rates and wealth in life insurance contracts by type of life insurance (2003)

		wealth		portfolio share	
	ownership rate	average	cond. average	average	cond.
term life insurance	12.7%	-	-	-	-
whole life insurance	51.5%	9'940	19'308	24.6%	37.2%
"regular"	46.9%	9'517	20'286	23.6%	38.1%
"apprenticeship"	1.7%	88	5'207	0.2%	10.3%
"death benefit"	6.4%	266	4'172	0.7%	8.7%
"trousseau"	1.1%	67	6'250	0.2%	11.7%
private pension insurance	13.3%	1'134	8'511	2.8%	15.9%

Source: EVS (2003), own calculations. Note: all results are weighted and in Euros (2001)

Next, we aim to know more about the characteristics of life insurance owners: We find the average of them to be richer than an average household without any life insurance. This gap is tiny between households with and without term life insurance but huge if we distinguish by the ownership of capital accumulating insurance products. Even looking at financial wealth other than wealth in life insurance contracts, we find the average owners of life insurance policies to be richer.

Looking at some further stylized facts, we find life insurance products to be more popular among married couples, households with children and households with a self-employed household head.

[2] The appendix contains a small analysis of the historical developments in the ownership of death benefit insurance, apprenticeship insurance and trousseau insurance.

[3] Average financial wealth in 2003 accumulated to 40327 Euros.

We also find a strong income gradient, which is especially steep between the first and the third income quintile (see table 2). While this might hint at some possible motives to purchase life insurance, we leave this aside for the moment and return to the matter in the context of multivariate regressions.

Table 2: Life insurance ownership and household characteristics

	term life insurance	whole life insurance	private pension insurance
Household Type			
single	5.5%	35.2%	9.6%
couple	10.1%	53.5%	9.4%
single + cohabitants	13.9%	50.9%	18.4%
couple + cohabitants	25.5%	73.6%	20.2%
Marital Status			
married	17.7%	63.5%	14.7%
not married	7.7%	39.3%	11.9%
Children			
no children	7.9%	43.8%	10.3%
1 children	17.8%	61.7%	19.0%
2 and more children	26.1%	70.3%	19.4%
Work Status			
self-employed	19.1%	69.2%	26.7%
civil servants	19.5%	68.5%	15.6%
employees	18.8%	62.6%	19.4%
Income[4]			
1st quintile	4.7%	34.9%	4.9%
2nd quintile	12.3%	48.8%	18.1%
3rd quintile	18.1%	63.4%	19.6%
4th quintile	21.4%	70.3%	20.1%
5th quintile	24.6%	76.0%	21.9%
All	**12.7%**	**51.5%**	**13.3%**

Source: EVS (2003), own calculations, weighted results

[4] Income is total household income from work. To avoid strong age- and retirement-effects in the income distribution, the sample is restricted to households with a household head aged 65 and below.

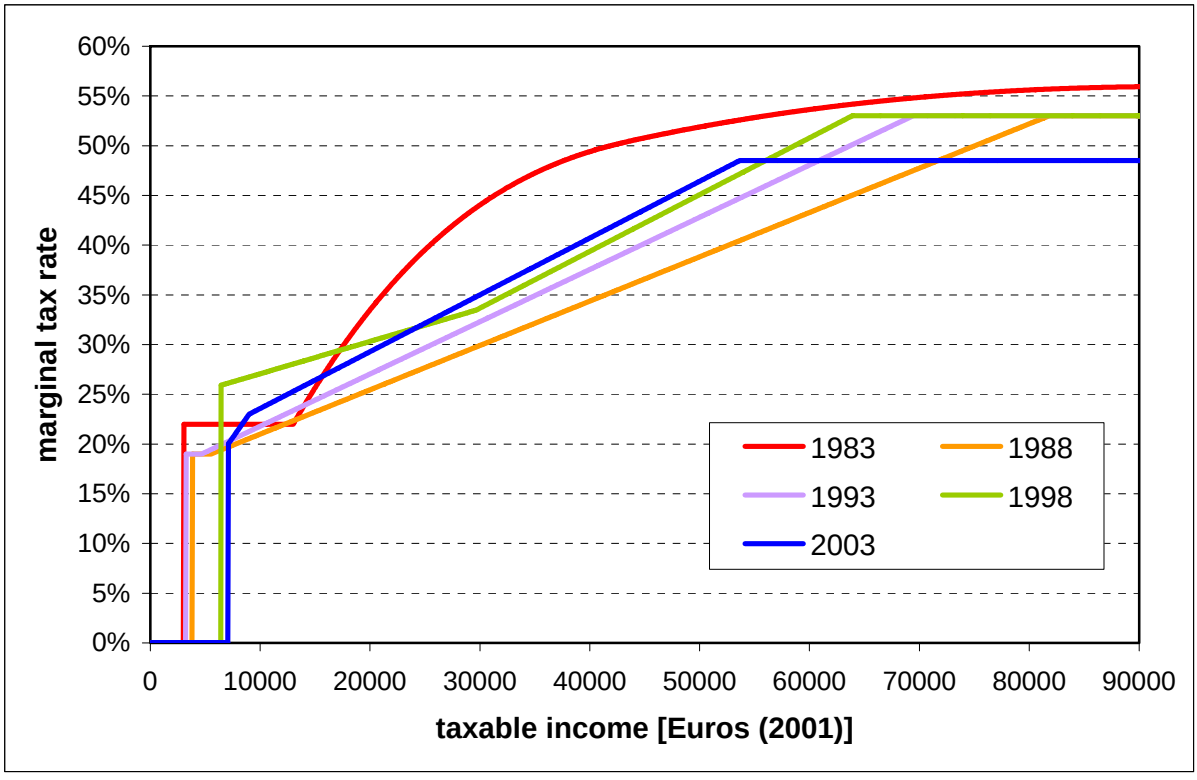
II.2. *Taxation and life insurance products*

We now turn to one of the key sales arguments for life insurance products: their favorable tax treatment. We first describe the German income tax scheme as the basis to which the tax favors are applied and then turn to the actual privileges and the conditions under which they are granted.

The German personal income tax scheme

The German income tax scheme is characterized by its progressive tax rate. A number of tax reforms have touched the amount of tax allowance and the actual tax rates (see figure 2).

Figure 2: Changes in marginal tax rates between 1983-2003



Source: Own calculations based on German tax laws; Note: Tax rates for a single person with no children

Note that the level of tax allowance also depends on the number of children and that certain types of transfer income remain untaxed or are subject to reduced tax rates. Further, different and independent amounts of tax allowance apply to different kinds of income.[5] Last, there is a

[5] The German tax system differentiates e.g. between income from employment, from self-employment, from financial assets, and rental income. For most of them, a certain tax allowance applies and advertising costs like costs

splitting option for married couples which taxes each spouse on half the total of their combined incomes. Hence, there is a certain level of variability in household tax rates for a given level of income. This is crucial to our target of separate effects of income and taxation, which we will further discuss later.

Capital income is subject to general income taxation and hence taxed at the individual tax rate. That is, Germany does not have a flat tax rate which applies to all capital income like some other European countries. There is an independent tax allowance for interest and dividend payments. Realized capital gains are taxed only if they exceed a tax exemption limit. Unrealized capital gains remain untaxed. Realized capital gains also remain tax free if they are realized after a certain holding period.

Tax favors towards life insurance products

German tax laws provide two kinds of tax subsidization towards life insurance contracts. First, expenditures for various kinds of insurance – and among them life insurance policies – can be deducted from taxable income. Second, interest income earned in a life insurance contract remains untaxed. These two ways of subsidization can be claimed simultaneously but are subject to certain conditions. If the conditions are not met, interest payments within an insurance contract will be treated just like any other capital income: The share of interest income will be taxed at the personal interest rate with every payment from the contract. In the case of a lump sum payment, the entire accumulated interest would be taxed in the year of the payout.

Tax-deductibility of expenditures

All types of private life insurance and private pensions have to fulfill certain conditions to qualify for tax deductibility: first, there have to be regular contributions; i.e., no lump sum contributions are allowed. Second, payments from the contract are not allowed within 12 years after the inception date. Expenditures for private term life insurance are deductible without such condition. Contributions to mutual fund based insurance contracts cannot be deducted.

Two aspects make deductibility a rather complex topic though. First, not only contributions to life insurance contracts are deductible but so are other expenditures. The core set of expenditures relates to some kind of insurance. Second, the deductibility is capped, which is why we have to bother in the first place. If certain deductible expenditures are inevitable for the household or

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for commuting may – at least partly – be deducted. The resulting subtotals are then added up to calculate the assessment basis to which the main tax allowance is applied.

decided upon before it comes to the question whether or not to buy life insurance, the deductibility cap may already be reached without further expenditures. Most important among the inevitable tax deductible expenditures are employees' compulsory contributions to the social security system. This includes the public pension system, public health insurance, public unemployment insurance, and public long term care insurance. For those, who are either not obliged to contribute to social security or can opt out, the voluntary contributions to social security or the equivalent private insurance premia can be deducted[6]. Apart from insurance premia, also expenditures for tax consultants, premia for private liability insurance or car liability insurance etc. are deductible.

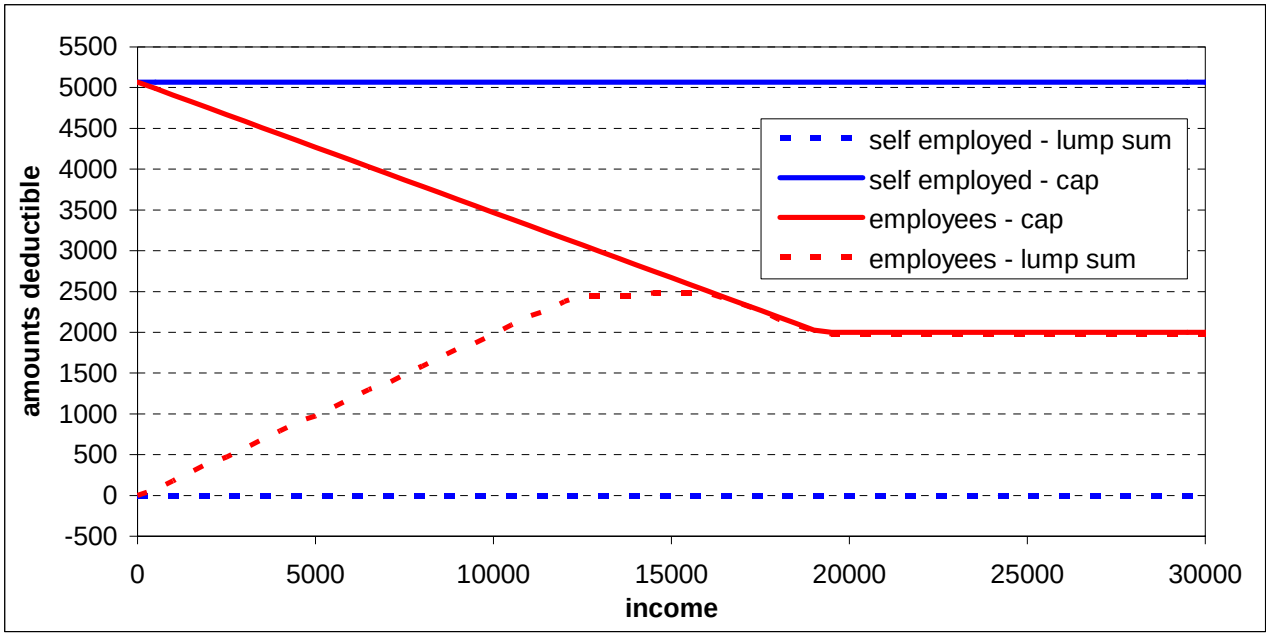
Deductibility cap and lump sum deduction

The deductibility of expenditures is capped in a rather complex way. For each year and all tax payers, there is a general upper cap. In 2003, this cap was 5069 Euros for singles and 10138 for couples who are jointly assessed. Yet these amounts essentially only apply to individuals who earn income solely from self-employment. The reason is that employers' contributions to social security remain untaxed for the employee, so that the deductibility of additional expenditures is lowered accordingly. At a gross income from employment of roughly 19500 (39000) Euros, the cap reaches its minimum at 2001 (4002) Euros for singles (couples) (see figure 3).

At the same time, German tax authorities apply a lump sum deduction of 20 percent of the taxpayer's income from employment up to certain limits. This takes into account that all employees pay roughly 20 percent of their incomes as social security contributions. Hence, the lump sum deduction rises with a taxpayer's income while the deductibility cap is reduced. As a consequence, for employees with an income of about 17500 (35000) Euros, the lump sum deduction equals the upper limit for deductions (see figure 3).

[6] The self employed can freely choose to contribute to the social security system. Employees with earnings above a certain income threshold can opt out of the public health insurance and buy private insurance instead. There is no opting out of the public pension system for employees though. Long term care insurance is always linked to health insurance - i.e. the privately health insured also have private long term care insurance and those who contribute to the public health insurance are covered by public long term care insurance.

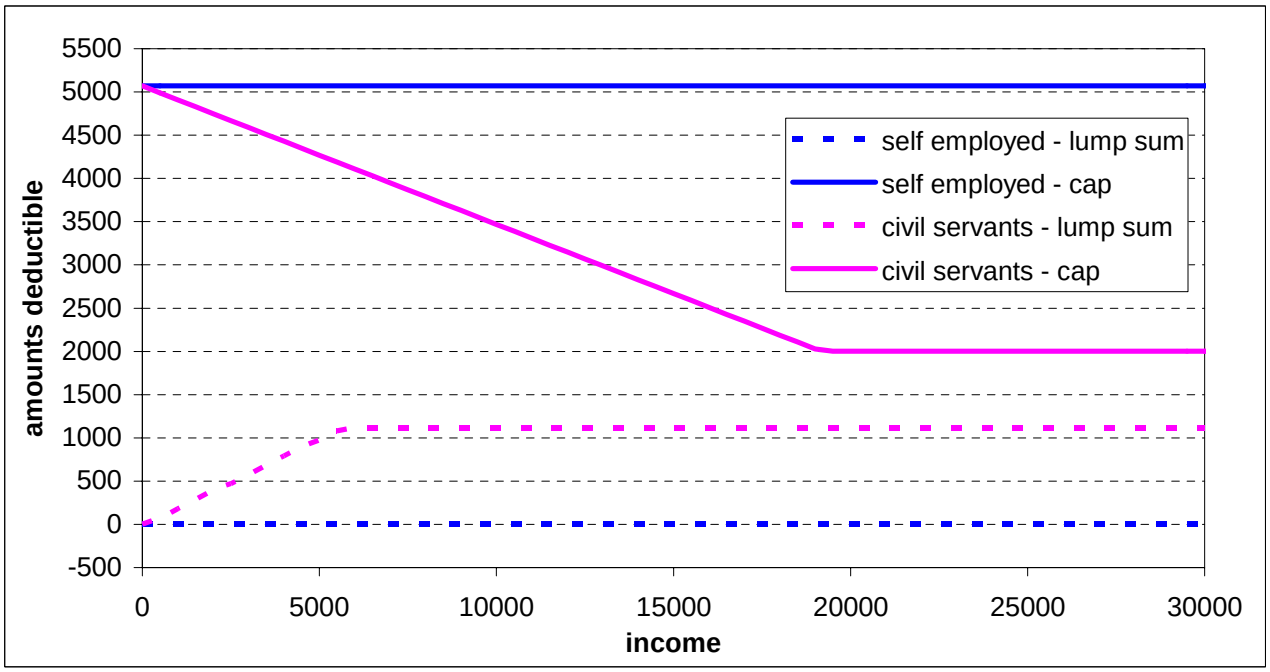
Figure 3: Lump sum deduction and deductibility caps for employees (2003)



Source: Own calculations based on Germans tax laws

For civil servants, the deductibility cap is the same as for all other employees but the lump sum deduction is lower (see figure 4). Therefore, civil servants can always enjoy at least some tax advantage from additional tax deductible expenditures independent of their income.

Figure 4: Lump sum deduction and deductibility cap for civil servants (2003)



Source: Own calculations based on Germans tax laws

Table 3 highlights, how different expenditures matter for civil servants, self-employed and employees, and how these different employment groups make use of the possible deductions. To keep things comparable we restricted the respective samples to single households. Individuals are assigned to the respective occupational groups depending on their main source of income. We categorize the different expenditures in what we consider inevitable expenditures and expenditures on life insurance premia. For the inevitable expenditures, we use two different definitions – a rather tight one and a second, which we call "extended definition".[7]

For each section, we calculate the subtotal of expenditures and the corresponding deduction from taxable income. Last, we indicate the share of households which reaches the deductibility cap at each subtotal and the average excess expenditures – i.e. expenditures above the amount needed for maximum deduction. At the bottom of each column, we have indicated the maximum possible deduction.

The first section shows, that over 83 percent of the employees already reach the deductibility cap declaring only their inevitable – and largely compulsory – expenditures. The equivalent shares among civil servants and self-employed are 37.6 percent and 28.3 percent respectively. Looking at the extended definition of inevitable expenditures, the overall picture does not change much. We should note though that occupational pension funds play an important role for some groups of self-employed, e.g. lawyers.

Looking at the third section of table 3, we find average contributions to life insurance contracts by the self-employed (2266 €) to be considerably higher than for the other two groups (704 € among civil servants and 575 € among employees). Looking at the ratios of additional tax deductions to additional expenditures from life insurance premia, we find them to reach only 6.5 percent among civil servants and self-employed and an even lower 2.5 percent among employees. Hence, at least on average, the tax subsidy on life insurance premia amounts to less than 3 percent of the expenditures. Looking at these numbers, tax deductibility seems rather unlikely to be an important argument for purchasing life insurance – at least for the majority of the population.

[7] For a detailed overview over the expenditures included in the two definitions see the appendix.

Table 3: Utilization of the deductibility of contribution by type of occupation

	civil servants		self-employed		employee	
age	38.7		45.9		39.4	
labor income	31'000 €		27'355 €		28'545 €	
ownership rate (any kind of life insurance)	62.2%		63.7%		55.8%	
observations	723		373		3836	
I. "inevitable" expenditures						
public pension system	- €		1'186 €		2'678 €	
public unempl. insur.	- €		5 €		893 €	
public health insur.	- €		163 €		1'578 €	
voluntary publ. health insur.	147 €		1'184 €		278 €	
private health insurance	1'651 €		1'542 €		210 €	
additional priv. health insur.	260 €		356 €		125 €	
publ. long term care insur.	19 €		147 €		231 €	
private long term care insur.	161 €		167 €		15 €	
car liability insurance	342 €		432 €		309 €	
	2'580 €		5'181 €		6'316 €	
deduction (I.)		1'700.5 €		3'717.2 €		2'063.0 €
share of households at the deduction cap (I.)		**37.6%**		**28.3%**		**83.4%**
excess expenditures (I.)		489.8 €		1'214.5 €		3'673.1 €
II. "inevitable" expenditures (extended definition)						
occup. pension funds	7 €		110 €		53 €	
civil servants pension funds	5 €		5 €		103 €	
voluntary public pension system	19 €		482 €		14 €	
	31 €		597 €		170 €	
	2'611 €		5'778 €		6'486 €	
deduction (II.)		1'707.7 €		3'863.0 €		2'065.4 €
share of households at the deduction cap (II.)		38.1%		33.1%		83.5%
excess expenditures (II.)		509.7 €		1'632.4 €		3'839.8 €
III. total expenditures incl. life insurance premia						
life insurance premia	704 €		2'266 €		575 €	
	3'314 €		8'044 €		7'060 €	
total deduction (III.)		1'754.0 €		4'010.6 €		2'078.9 €
excess expenditures (III.)		1'037.6 €		3'529.1 €		4'388.5 €
max. possible deduction		**2'238.5 €**		**5'029.2 €**		**2'315.2 €**

Source: Own calculations based on the EVS (2003), weighted results

Table 4 suggests further, that it might rather be a question of financial means whether or not people decide to save in life insurance. We split the above samples depending on whether households reached the deductibility cap based on their "inevitable" expenditures or not. We find households at or above the cap to be more likely to invest in life insurance and to hold more wealth in life insurance contracts. For civil servants the differences are both highly significant: Among the self-employed, the difference in ownership rates is not significant but the conditional wealth holdings are again significant at the 1% level. Among employees, the difference in conditional wealth levels is not significant, but the difference in ownership rates is[8]. Comparing the financial means of the two groups, we find the households at or above the deductibility cap to earn significantly more income and to have higher saving rates. To rule out that households below the deductibility cap just save in different products we calculate the saving rates without savings in life insurance contracts and find that our results remain unaffected.

Table 4: Life insurance ownership and wealth by opportunity of further deductions

	civil servants		self-employed		employees	
	at or above the cap	below the cap	at or above the cap	below the cap	at or above the cap	below the cap
observations	317	406	116	257	3395	441
	723		373		3836	
life insurance ownership	68.6%	58.3% (0.006***)	70.0%	61.2% (0.113)	59.3%	38.1% (0.000***)
wealth in life insurance (cond.)	19'263 €	10'363 € (0.000***)	50'614 €	24'398 € (0.000***)	11'579 €	9'566 € (0.138)
income from work	39'201 €	26'052 €	44'838 €	20'466 €	32'387 €	9'259 €
median saving rate (w/o life insurance)	11.1%	7.8%	10.3%	3.4%	7.7%	0.0%

*Source: Own calculations based on the EVS 2003, weighted results. Note: p-Values in brackets for tests of equality in ownerships rates and cond. wealth levels. *** denotes significance at the 1% level*

Tax free interest

Additionally to the tax deductibility of insurance premia all capital gains and interest earnings within the contract remain untaxed if contributions are made regularly and the first payments

[8] Using the extended definition of inevitable expenditures does not change our results. Only the difference in ownership rates among the self-employed turns significant (p=0.06).

from the contract lie at least twelve years after the inception date. In contrast to the deductibility of contributions no cap applies to this tax favor and mutual fund based insurance contracts enjoy the same tax favor as "classical" insurance contracts. Tables 2 and 4 have already suggested that households which have invested in life insurance products receive higher incomes from work. Hence, we can expect these households to also face higher marginal tax rates.

A more thorough inspection of the importance of the two types of tax subsidization for German life insurance buyers will require microeconometric analyses, which we will turn to in section four.

III. Theoretical considerations

Several authors have proposed models for the demand of life insurance products and derived testable hypotheses. Some of these models are motivated indirectly – i.e. their ultimate focus is not on the demand for life insurance but on some other phenomenon. Yet there is a lot to be learned from these models: They all cover specific aspects to the demand for life insurance and thus matter for our rather comprehensive analysis.

III.1. *General relevance of the demand for life insurance products*

First, we are interested in the determinants of the demand for life insurance as such. Life insurance wealth plays an outstanding role in German households' portfolios and it seems important to reach a better understanding of the factors influencing this vast market. Furthermore, the life insurance industry is an important employer and used to be a core element of the highly interwoven corporate sector in Germany. Hence, all political reforms affecting the market environment tend to trigger an intense debate, which also calls for a sound understanding of the actual mechanisms behind private households' decisions and possible reactions to such reforms. The reduction in tax advantages towards whole life insurance products is a recent example. Among the literature touching the demand for life insurance products, two analyses take a similar original interest in the demand for life insurance products: Jappelli and Pistaferri (2001) focus on a change in the tax treatment towards life insurance products which bears a strong resemblance to the recent German reform. They exploit this natural experiment to estimate the effects of tax incentives on the demand for life insurance products as they are suggested by theoretical models of portfolio choice. Walliser and Winter (1999) focus on the German insurance market and propose a small theoretical model, which incorporates some important characteristics of this market. We adopt some of the hypotheses developed in these two papers and extend them in some dimensions.

III.2. *Savings motives*

Apart from this general interest, our second focus is on the identification of the savings motives at work in connection to the demand for life insurance. The coexistence of several savings motives is also the main reason why we do not adopt the very basic hypotheses suggested in the literature, e.g. by Yaari (1965) and Bernheim (1991). One such basic hypothesis derived from a

very simple model is, that nobody should hold term life insurance and annuity products at the same time. A considerable share of households still holds both – a puzzle which has been established for several countries which is also supported by our data[9]. Note that the above hypothesis is based on a model where term life insurance products and private annuities are bought to arrive at an optimal level of annuitized pension wealth. Now it is important to know that the typical German annuity insurance product can always be paid out in a lump sum. Hence, purchasing a private annuity and term life insurance is not necessarily a contradiction to this basic hypothesis. Furthermore, other savings motives are not included in this rather parsimonious model but might cause a simultaneous demand for term life insurance and private pensions. What we learn from this example is that although a variety of testable hypotheses can be derived from theoretical models, it is important to keep in mind the contextual market environment.

In the following, we go through the list of possible savings motives and refer to hypotheses suggested in the literature as they connect to the demand for life insurance products. We make adaptations where necessary and add aspects, which have not been discussed in the literature, where they naturally arise in the context of the German market.

Old age provision

First and foremost life insurance has been promoted as a means of private old age provision. Feldstein (1974) suggested that private and public old age provision should be substitutes. Once a household receives less than his desired replacement rate from public pensions, his private savings will fill the gap. Hence, for a given replacement rate the level of private savings will increase with a household's income. Savings in life insurance contracts can be paid out as an annuity and are therefore a close substitute to social security wealth. We therefore expect the probability of life insurance ownership to rise and more savings to go into life insurance products the higher the need for additional private old age provision is.

Unfortunately, there is no generally available data source for Germany providing information on social security wealth and wealth in life insurance contracts. The income and expenditure survey (EVS) which we base our analysis on, is the only data source in Germany which contains a sufficiently detailed level of information on household savings and wealth. While we describe our data in more detail later, it is important to know at this point, that the EVS has no longitudinal dimension and also does not provide an earnings history, which would allow the calculation of a

[9] 2.73 percent of all households hold both, annuity insurance and term life insurance. 21.4 percent of households who have a term life insurance also have annuity insurance.

proxy for social security wealth. We therefore rely on different proxies for private old age provision needs:

First, replacement rates in the public pension system differ across households for a number of reasons. The self-employed are typically not covered by the public pension system. That is, their replacement rate is essentially zero and the need for additional private old age provision will tend to be high. Civil servants are covered by a separate public pension scheme which differs from the employees' scheme in a few minor aspects. We therefore compare the self-employed to employees and civil servants and expect the self-employed to be considerably more likely to hold life insurance policies and to accumulate more life insurance wealth.

Second, there is a certain degree of variation in replacement rates within the group of employees. As contributions to the public pension system are capped, the pension claims also rise only up to the corresponding income level. Figure 5 illustrates how many earnings points a person receives for a given gross income. Without the assessment ceiling pensions would be a linear function of pre retirement income. Given that contributions and earnings points are independent of the income above the ceiling (61200 € in 2003), the actual replacement rate of individuals with a higher income declines with income.

Figure 5: Effects of the assessment ceiling on the public retirement income of high income households

Source: Own calculations

If people save to achieve a certain target replacement rate, they will need additional private savings. Accordingly we expect households with an income above the contribution ceiling to be more likely to invest in life insurance products and accumulate more life insurance wealth. At the same time it is questionable, how large this effect will be. Only few individuals will receive incomes considerably above the contribution ceiling for an extended number of years. Figure 5 shows the annual annuity which would have to be bought for one year of income above the assessment ceiling if the individual meant to make up for the reduced public replacement rate.

Bequest motives and insurance for the family

The second savings motive which is often mentioned in connection with the purchase of life insurance products is the bequest motive. Talking about a bequest motive, we do not distinguish an actual bequest motive from a motive to insure the family against the early death of an earner. Given that the EVS does not contain a question on planned bequests we employ several proxies for a possible bequest motive. Like Hurd (1987, 1989) we employ the existence of children. Generally, all accumulated wealth can be bequeathed and serve as an insurance for the family. Term life insurance can provide an additional coverage at rather low expenses. This also makes a whole life insurance more suitable for the task at hand than for example stock market wealth or wealth in an annuity insurance. We thus start with the hypothesis, that the existence and the number of children will increase the probability of purchasing a policy with some term life component. Apart from the pure existence and number of children, the age of the children may matter. Consider the stream of child related expenditures up to the age at which a child could provide for herself. The present value of these expenditures will typically decrease with the child's age. Hence, we further conjecture, that families with young children are more likely to purchase a policy which includes term life insurance than families with near-grownup children.

Bernheim (1991) suggests that also the intra-household allocation of assets may matter for the demand for term life insurance. He argues that if the survival-contingent incomes of the two partners differ substantially it may make sense to purchase term life insurance to reduce this imbalance. Insuring the death of the spouse with the higher income will leave the other spouse with the insurance sum. We are not aware of an empirical analysis which tests the corresponding hypothesis: We expect the probability of some sort of term life insurance in a household to be higher the more the income flows of the spouses differ.

Home loan motive

Third and last, the intention of buying or building a house of one's own will often trigger demand for life insurance products. First, banks frequently require a household to have some kind of term life insurance to get the credit in the first place. And second, it is not uncommon to pick the lump sum payout option and use the life insurance savings to buy back the outstanding mortgage. We conjecture that home owners with outstanding credit will be more likely to have some term life insurance.

III.3. *Tax incentives*

Some households would probably name the possibility to save taxes as an independent savings motive. The importance of the favorable tax treatment as a sales argument for life insurance products would suggest ranking the tax savings motive second after the need for private old age provision if not even first. Nevertheless, we separate the aspect of tax incentives from the original savings motives. The reason is that tax incentives affect the characteristics of an asset rather than determining the preferences of the investor.

Taxfree interest

Strictly speaking, tax incentives change the after tax return of an asset. Note that while the pre tax returns are equal for all investors, after tax returns may vary substantially depending on the person's individual tax rate. In most standard theoretical models of portfolio choice the optimal asset allocation depends on the expected returns of the available assets, their risk and their cross-correlations.[10] Apart from the asset allocation, also the consumption-savings decision may be affected – the reason is the income effect connected to the return of the selected portfolio.[11] Yet under standard assumptions concerning the form of the utility function all these models imply, that the portfolio share invested in life insurance products should rise in the level of tax incentives.

Walliser and Winter (1999) tailor a stylized model of portfolio choice to the German case and explicitly model the tax advantage for life insurance products. They allow households to invest in

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[10] The capital asset pricing literature goes back to Markovitz (1952). First dynamic asset pricing models were suggested by Merton (1969, 1971, 1973) and Samuelson (1969).

[11] Campbell (2002) gives a nice overview over the literature which integrates life-cycle consumption decisions with portfolio choice.

life insurance and bonds. Their numerical simulations imply that the tax favors for life insurance contracts are a key determinant of the demand, especially early in the life cycle.

We follow their hypotheses and expect households with higher tax rates to invest more in life insurance contracts, as the difference in after tax returns between life insurance products and other assets increases with the households' tax burden. We further expect the probability to hold life insurance products to increase in the household's tax rate. Simple portfolio choice models imply that essentially all available assets will be part of the optimal portfolio. Indivisibilities or market entry costs may prevent some people from investing in all assets though. Hence, the probability to actually invest in a certain asset increases in those factors that increase the optimal amount invested in a world without such restrictions. Thus we can conjecture that households facing higher tax rates will also be more likely to invest in life insurance contracts. Note that the above argument also holds for possible other determinants of the demand for life insurance products, especially the savings motives discussed above.

At this point a note on the importance income seems necessary. Looking only at the portfolio choice, there is no consensus, whether income should play a role. Campbell and Viceira (2002) give an overview over the circumstances under which portfolio choice should depend on the level of income. Apart from these theoretical considerations it has repeatedly been argued that the co-movement of income and tax rates will always prevent us from distinguishing the two in an empirical analysis. The basic argument is that the effective tax rate will always be a (nonlinear) function of income. We are confident, that the situation is not all that bad in our case as we have outlined in the previous section.

Tax deductibility of contributions

The effects of the deductibility of contributions to life insurance contracts have been ignored by earlier studies although the two ways of favorable tax treatment are conceptually independent and different groups of households may benefit most from the one or other advantage. We have described in detail, why there may be substantial variation in the amount by which households will profit from the deductibility of contributions. Following the above logic we expect households with a higher tax advantage to be more likely to invest in life insurance products. We further hypothesize them to invest more and thence accumulate larger amounts of wealth.

IV. Data

We make use of six cross-sections of the German Income and Expenditure Survey (EVS). The most recent data stems from 2003, the oldest from 1978. The data was collected in 5-year intervals and originally aimed at the calculation of consumption baskets. Hence, the Federal Statistical Office never bothered to add a longitudinal dimension to the survey although a considerable number of households is known to have participated repeatedly. The data includes sociodemographic and economic information both at the individual and at the household level. It is fully imputed but given the cross-sectional nature, some data harmonization has to be done. Each dataset contains between 40.000 and 60.000 households, which allows us to analyze population subsamples. The sample size and the rather long time span between 1978 and 2003 also allow us to investigate age trajectories of synthetic cohorts up to high ages. Aside from the extensive sociodemographic information, the EVS data contains detailed information on the household members' income by sources and taxes paid. Further, there is detailed data on the households' expenditures, be it for consumption goods, for insurance premia, for the purchase of assets or for the repayment of debt. Last, there is a section on household wealth.

A few issues are to be mentioned when using the EVS data. While the sample is designed to be representative for the German population, the institutionalized as well as households with extremely high incomes are excluded from the sample. For 2003, this sampling threshold was a net monthly household income of 18.000 €.[12] Last, foreigners are included in the sample only since 1993. Apart from these sample restrictions, we should note, that the EVS is carried our as a quota sample. The sample is aimed to include 0.2% of the population in each quota cell. The quotas are generated based on a number of household characteristics, including household type, income and social status of the household head. The quotas are known to be reached with differential success though. While the quotas for civil servants are reached rather well, the quotas for farmers and unemployed households have turned out to be difficult to reach. To compensate for the differential success to fill the quotas the federal statistical office provides weights. While the choice of a quota sample seems problematic experiments to switch to a random sample have turned out to generate even lower response rates from certain population subgroups. Instead, several measures have been taken to compensate for the issues of a quota sample. Especially the

[12] Sommer (2005) discusses the possible effects of the income threshold on life cycle trajectories of synthetic cohorts.

non sampling issues were reduced by assigning the interviewers the households to be questioned.[13]

Life Insurance in the EVS

The EVS 1993 through 2003 contain data on wealth holdings in life insurance contracts - specifically the surrender value. For 2003, we can distinguish between various types of life insurance products. For the years 1978 through 1993 the questionnaire only contains the insurance sum. Given that we have information on the surrender values and the insurance sums in 1993, we exploited this information to impute the surrender values for the years 1978-1988 using regression based imputation.[14] Further, we know about the households' expenditures on life insurance premia, as well as pension payments and lump sum payouts received from private life insurance contracts. For our empirical analysis we focus on four variables: life insurance ownership, premium payments for life insurance contracts, wealth in life insurance contracts, and the portfolio share of financial wealth invested in life insurance products.

[13] For a detailed methodological description of the EVS see Statistisches Bundesamt (2005)

[14] The imputation is described in Sommer (2007)

V. Empirical Results

In the section describing the German market for life insurance products, we have pointed out important trends which have evolved over the last decade and which coincide with two recent developments: First, there have been substantial cutbacks in tax favors towards whole life insurance contracts. At the same time private pensions continue to be strongly tax favored. Second, private old age provision has gained additional importance after several reductions in the public pension system. Given these changes in the market environment these trends seem only reasonable reactions on behalf of private households. Yet the most drastic reforms date from 2002/03 (the "Riester Reform") through 2005 (the "Rürup Reform") – given that the latest EVS data stems from 2003, we can not expect to see behavioral reactions to these reforms in our data. We will therefore start with a more in depth inspection of past trends in the demand for life insurance – specifically at the cohort level – and then turn to regressions to better understand the importance of the various motives for an investment in life insurance products. Note that throughout the following cohort analysis we do not present confidence bands for our estimates. A short discussion of the accuracy of our estimates can be found in the appendix.

V.1. *Historical Developments at the cohort level*

Before turning to the actual results, a few notes should be made: We use all six cross-sections but exclude East German households[15] to keep the cohorts as homogeneous as possible over time.[16] Furthermore the households' age has to be defined. We follow the common procedure of assigning each household the age of its household head. Defining the household head to be the oldest male in the household and the oldest female in a household with no male members we deviate from the EVS definition. The EVS defines the household head to be the main earner. Whereas our definition ensures that intact households will always be attributed to the same birth cohort the EVS definition does not. Specifically, the household head may switch between two years because of changes in the composition of the household income, e.g. following the retirement of the previous household head. Households with a large income drop of the old head would be more likely to be reattributed to a different birth cohort than other households.

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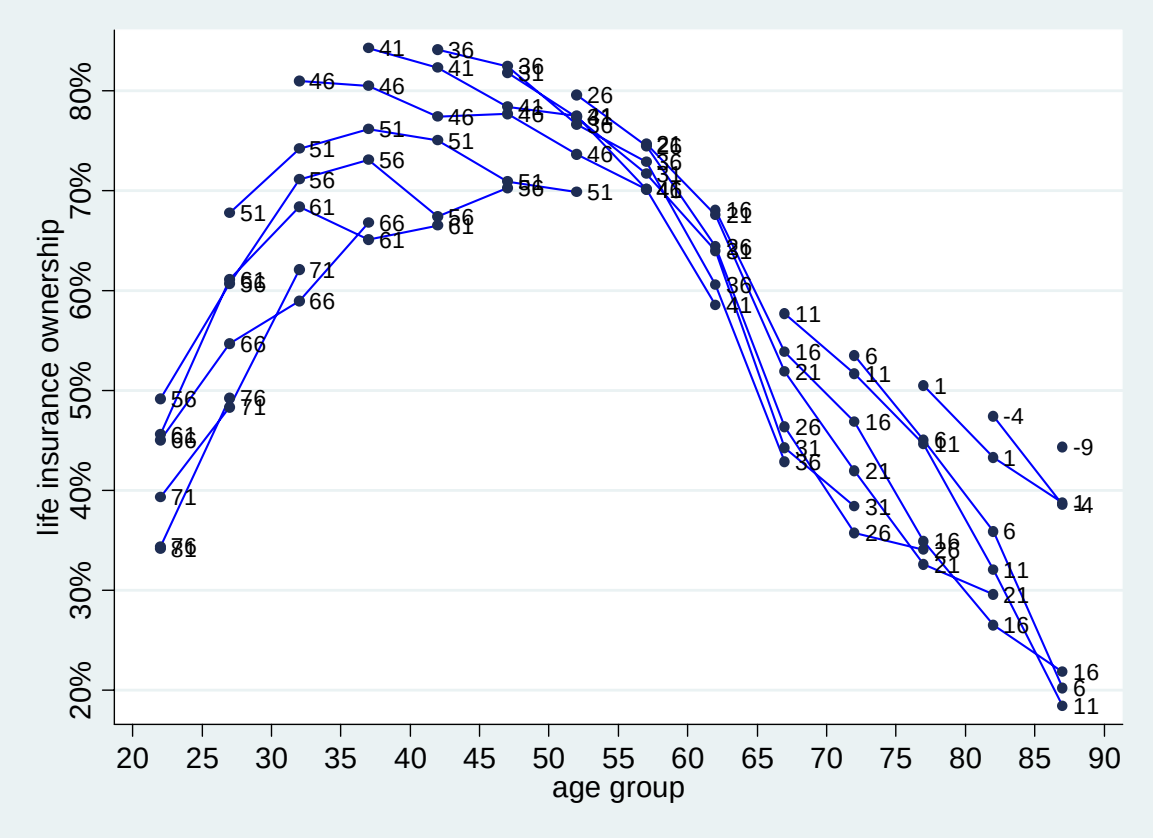
[15] The EVS contains East German households starting in 1993.

[16] We only know the actual place of residence of a household and have no information about their place of residence before the reunification. Hence, migration will bring in some heterogeneity but the effects of including the entire East German sample would have caused unequally larger disturbances.

Ownership rates of life-insurance

We start our cohort analysis with the first decision connected to any investment: whether or not to invest in the first place. Looking at the age trajectories of the synthetic cohorts, our first observation is the clear hump shape in ownership rates over the life cycle. 35 to 50 percent of the households own a life insurance contract between age 20 and 24. Between age 35 and age 55 we observe cohorts with as much as 80 percent life insurance owners. Around age 60 the share drops steeply and declines continually towards 20 to 40 percent after age 80 (see figure 6).

Figure 6: Age-trajectories in life insurance ownership by cohort (West Germany)[17]



Source: Own calculations based on the EVS 1978-2003, weighted results

What strikes us at the second look are the differences between cohorts at certain ages. First, among the elderly, life insurance ownership is much less popular today than it was until the late 1980s. Part of the reason is likely the much lower popularity of death benefit insurance

[17] Households who indicate ownership or give a positive value for the insurance sum are considered life insurance owners. Birth cohorts are highlighted in the graph with tags. Following the dots labelled "66" we observe the age trajectory of the households whose head was born between 1964 and 1968.

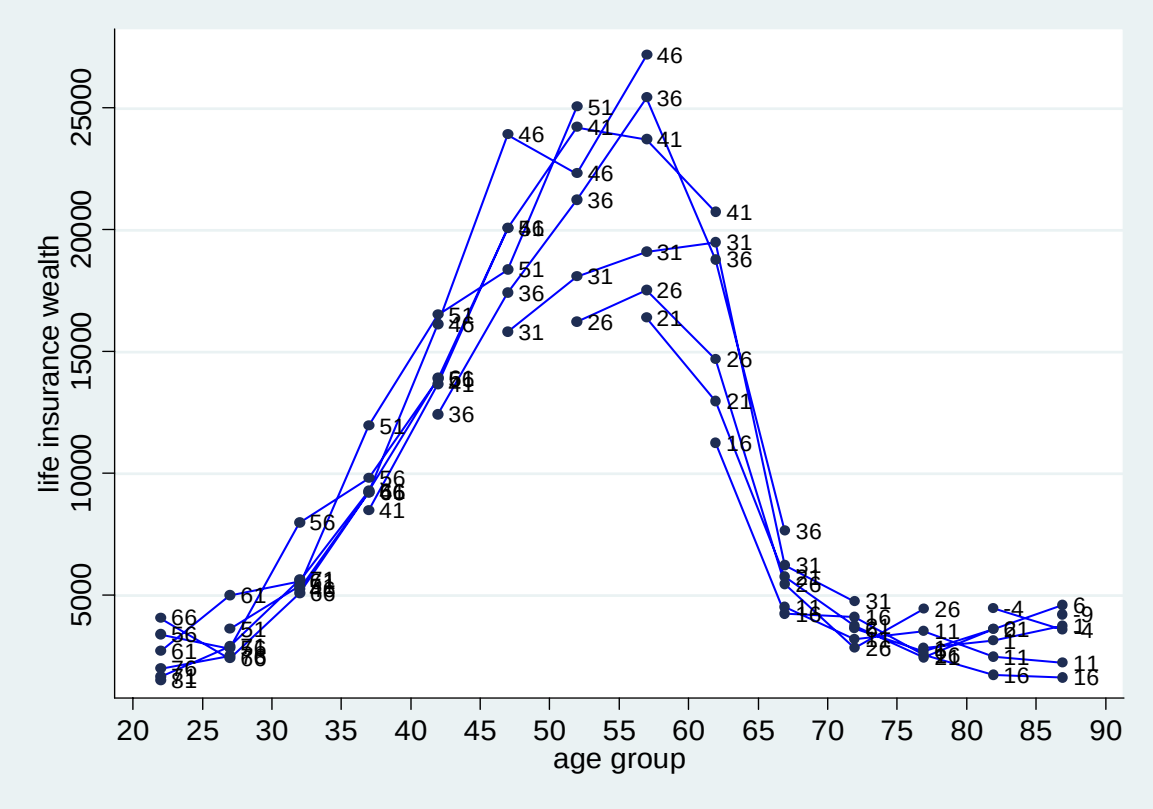
contracts.[18] But also the reduction of composite households at these age-groups may be a reason. With less young cohabitating children the likelihood of a life insurance owner in the household is obviously reduced.

Second, we observe substantial shifts in life insurance ownership between young cohorts up to age 45. Chen, Wong and Lee (2001) report similar drop backs for young cohorts in the United States. They speculate later marriage, household formation and childbirth to play a key role. Following their argument, we would expect the age-profiles of the young cohorts to be steeper. We find that the differences between cohorts tend to grow smaller towards age 50 in the German data which is in line with what we would expect under the above hypothesis.

Wealth in life insurance contracts

Looking at average wealth in life insurance contracts, one of our findings from the ownership rates is matched, the other not.

Figure 7: Age-trajectories of wealth in life insurance contracts by cohort (West Germany)



Source: Own calculations based on the EVS 1978-2003, weighted results

[18] For an illustration of the developments in ownership rates of death benefit insurance, apprenticeship insurance and trousseau insurance see the appendix.

Average wealth levels of today's elderly households reach only 30 to 50 percent of their predecessors 20 to 25 years age (see figure 7). As the ownership of life insurance policies in this age group has also dropped quite considerably, wealth holdings among those who actually hold life insurance have changed rather little. Or, put differently, the drop in average wealth levels can be largely attributed to the drop in ownership rates.

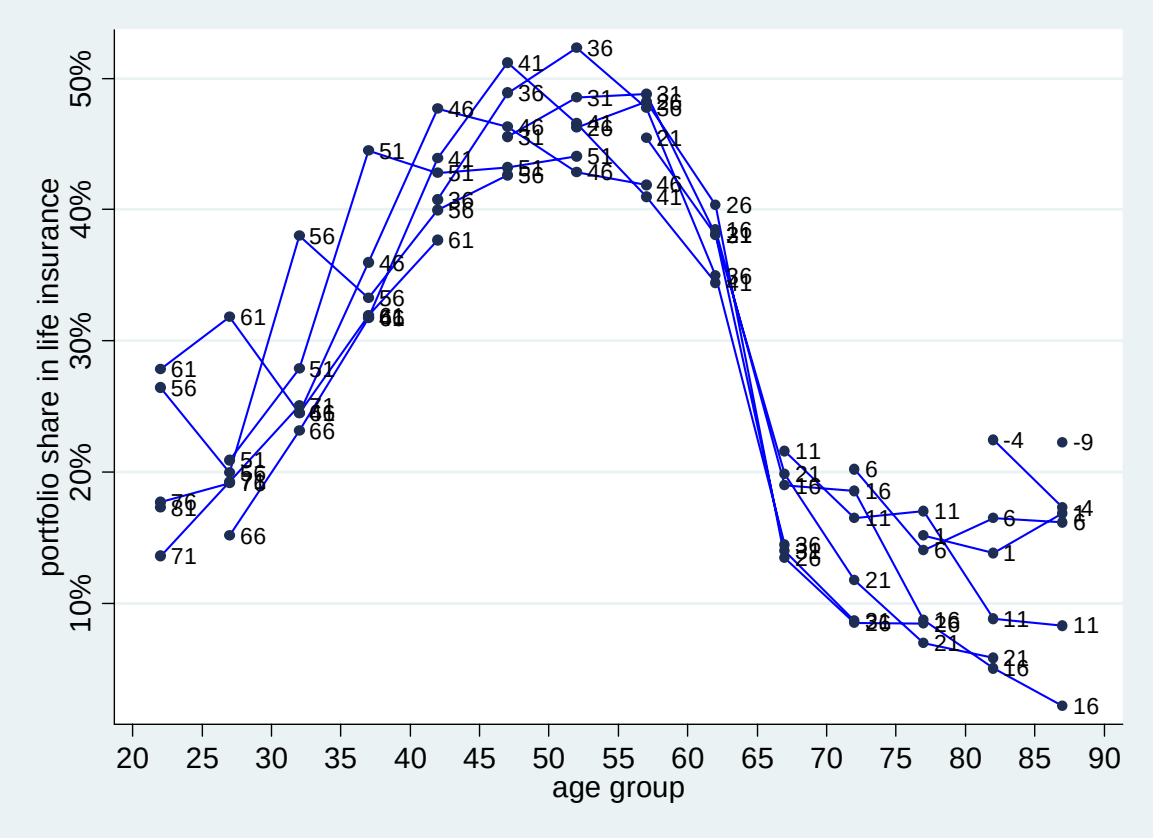
While average wealth among the old age-groups has dropped, the opposite is true for the age-groups around age 40: today's middle-aged households hold larger amounts of life insurance wealth than their predecessors and this gap between cohorts is widening towards age 55. Given that ownership rates of the younger cohorts are lower, we can conclude that those who actually do have life insurance hold considerably larger amounts of wealth at this age. Further, the widening of the life insurance wealth gap between age 40 and age 55 is partly caused by the narrowing of the gap in ownership rates described above. Overall, we know little about the underlying reasons for the above findings. A candidate explanation would be a strong increase in wealth inequality in this age-group. Whereas a lot is known about aggregate trends in wealth inequality, we are not aware of an analysis breaking down these aggregate trends to the cohort level.

Portfolio shares in life insurance contracts

Looking at the share of financial wealth invested in life insurance, we again find huge changes among the very old (see figure 8). In 1978, the average household with a head aged 65 and above held 25 to 35 percent of its financial wealth in some kind of life insurance product. 20 years later, this share had dropped to below 10 percent. The displacement of life insurance contracts through other kinds of financial wealth shows clearly also among other age-groups. Yet up to age 60 the development over the last decades has been an up and down. Until 1988, the younger cohorts show higher portfolio shares invested in life insurance than their predecessors. With the growing importance of stocks and mutual funds in the 1990s the portfolio share invested in life insurance has dropped back behind the levels of the preceding cohorts.[19]

[19] For a more detailed analysis of asset accumulation and portfolio choice over the life cycle, see Sommer (2005).

Figure 8: Age trajectories in portfolio shares[20] of life insurance contracts by cohort (West Germany)



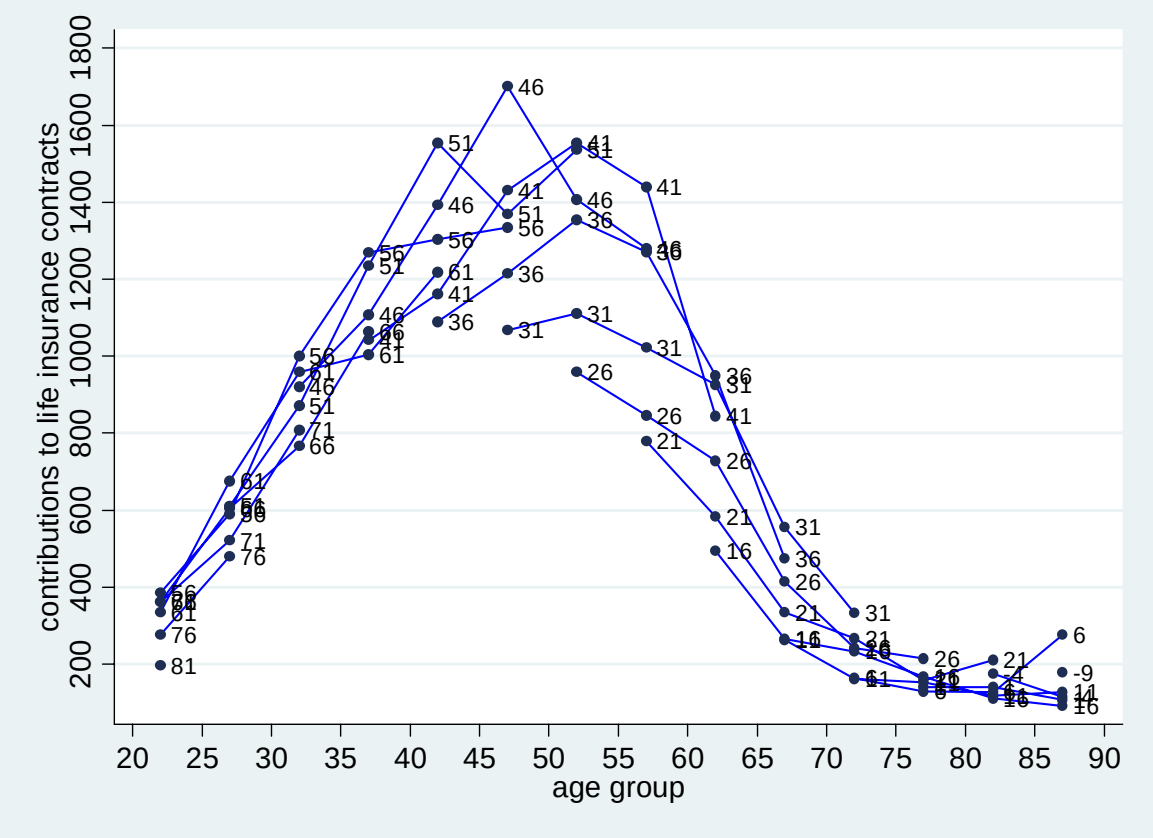
Source: Own calculations based on the EVS 1978-2003, weighted results

Contributions to life insurance contracts

To conclude this comprehensive overview, we last look at the age-trajectories of contributions to life insurance contracts (see figure 9). The age-profile is clearly hump shaped for all cohorts. We observe little cohort differences among the youngest and the oldest age groups. Yet in the middle of the life-cycle, we find younger cohorts to save significantly more than the previous generation at the same age 20 years before. Given that ownership rates among the young and among the very old have dropped considerably, the conditional contributions life insurance contracts must have increased for all age-groups.

[20] The portfolio shares are calculated as the average wealth in life insurance contracts divided by the average financial wealth holdings of each cohort at a certain age.

Figure 9: Age trajectories in contributions to life insurance contracts by cohort (West Germany)



Source: Own calculations based on the EVS 1978-2003, weighted results

V.2. *Regression analysis*

From the above we have gained some insight on the importance of life insurance products over the life-cycle. Our cohort analysis also allows us to track back some of the aggregate trends to its underlying meta-trends in the savings behavior of different generations. To actually relate the observed savings behavior to the underlying savings motives and to assess the effectiveness of tax incentives, we now turn to the microeconometric analysis.

Life insurance ownership

We start out with an indicator variable for wealth in life insurance contracts. We do not distinguish between the different kinds of capital accumulating policies and estimate probit regressions based on the pooled sample (1978 – 2003). Table 5 presents three specifications which aim to test the hypotheses derived in section 3. Note that all coefficients reported are average marginal effects. Most of the control variables are left out from the table.[21] Our control variables include dummies for the years of observation, the age of all household members, net wealth and net income. We experimented with a number of specifications with respect to the chosen functional form to test the sensitivity of our results and the core results remained essentially unchanged.[22]

Column (1) presents our basic specification: first, we find households with children to be more likely to hold wealth in life insurance. Yet throughout all specifications we tried, we observe the probability of life insurance ownership to be non-increasing with the number of children. Households with three or more children are not significantly more likely to hold life insurance than households without children. A married household head also increases the probability of life insurance wealth in the household. Hence, these first results are broadly in line with our hypotheses connected to the presence of a bequest motive or the desire to insure the family.

Turning to the retirement savings motive, we find one of our hypotheses supported. The self-employed turn out to be more likely to invest in life insurance products, whereas civil servants are slightly less likely. Our results concerning the self-employed remain consistent throughout all analyses and have the expected sign. Looking at households with work income above the contribution ceiling, we find their income above the ceiling to increase the probability of life insurance ownership as expected[23]. Yet the basic level effect has a negative sign and the overall probability contribution of the joint effect for incomes above the contribution ceiling is at first

[21] The complete results are available from the author upon request.

[22] A description of the variables used in the specifications but unreported in the results is included in the appendix.

[23] Note that we converted the income above the contribution ceiling in millions of Euros

negative. Further, the results are quite sensitive to the specification of the income term among our control variables. We restricted the sample to working age employees but did not receive evidence in support of our hypothesis. In other words – there is no convincing evidence that employee households above the contribution ceiling invest in life insurance to offset their lower replacement rate from the public pension system. Higher income households might just be happy with a lower replacement rate as the absolute level of public retirement income is not reduced. Yet while it is easy to come up with a possible explanation, we have to concede that our regression analysis cannot help us answer this question.

Looking next at the importance of home loans for the ownership of life insurance wealth we find a positive effect for the presence of a loan. The estimated coefficient is not significant in all specifications though. Instead, the ratio of outstanding mortgage to gross housing wealth turns out to be an important predictor of life insurance ownership. The higher the share of debt on housing wealth, the more likely is the household to hold wealth in life insurance products. Note that we do not distinguish different types of life insurance products at this point. Hence, we will pay more attention to the matter of home loans later.

Finally, we inspect the importance of tax motives for the probability to invest in life insurance: as expected we find the households' average tax rate to be a positive and consistently significant predictor for life insurance ownership. Note that this finding is robust to the chosen specification with respect to income and wealth.

The second specification adds to the question whether couples with highly unequal contributions to household income are more likely to hold wealth in life insurance products. Again, we employ the pooled sample but restrict the sample to couple households with at least one work income. We choose a reference group of households with rather equal contributions to household income from the two partners (distributions lying between 40/60 and 60/40). Moving towards a more unequal composition of household income we find the probability of life insurance ownership to increase. The effect is at first insignificant but turns significant at the 1 percent level for households in which one partner contributes only 10 to 25 percent to the household income. Yet the size of the effect of income inequality becomes smaller for households where one partner contributes no income or only a tiny share of less than 10 percent. We consider our results weak evidence in favor of an additional insurance motive among couples with high income risk.

Table 5: Probit-Regression - Life Insurance Ownership

	life insurance ownership		
	(1)	(2)	(3)
HoH male (D)	0.006	0.016	0.006
	(2.32)*	(3.56)**	(1.77)
unmarried, 1 child	0.052		0.059
	(11.05)**		(8.59)**
unmarried, 2 children	0.035		0.038
	(5.12)**		(3.93)**
unmarried, 3+ children	0.003		0.009
	(0.25)		(0.54)
married, no children	0.091		-0.088
	(23.68)**		(4.92)**
married, 1 child	0.098	-0.008	-0.079
	(22.07)**	(2.51)*	(4.25)**
married, 2 children	0.124	0.013	-0.071
	(26.14)**	(3.67)**	(3.86)**
married, 3+ children	0.103	-0.005	-0.088
	(19.05)**	(1.16)	(4.55)**
HoH self-employed (D)	0.083	0.020	0.094
	(20.34)**	(4.72)**	(14.91)**
HoH civil servant (D)	-0.019	-0.021	0.020
	(6.52)**	(7.12)**	(4.27)**
above contr. cap (D)	-0.010	-0.008	-0.048
	(2.18)*	(1.79)	(6.60)**
income above the contr. cap (in MEUR)	0.286	0.340	0.590
	(1.37)	(2.18)*	(2.21)**
mortgage (D)	0.014	0.001	0.018
	(4.40)**	(0.01)	(3.68)**
debt share (real wealth)	0.053	0.055	0.039
	(8.93)**	(8.94)**	(4.28)**
average tax rate	0.300	0.088	0.233
	(8.51)**	(3.85)**	(7.19)**
smaller inc. Share 25-40%		0.005	
		(1.18)	
smaller inc. Share 10-25%		0.015	
		(3.22)**	
smaller inc. Share <10%		0.007	
		(1.80)	
deductibility cap reached			0.046
			(10.22)**
possible further tax savings			-0.038
			(3.95)**
Observations	267282	157175	116523
Pseudo R^2	0.1198	0.0501	0.1183

Note: The t-statistics in brackets are calculated using heteroskedasticity consistent estimators.
** denotes significance at the 5 percent level, ** at the 1 percent level*

The third column inspects the importance of the tax deductibility of contributions. Looking only at households for which we can calculate the tax advantage we exclude composite households

from the sample. We also drop households from the sample if there are children who earn enough money to be liable to pay taxes.[24] Our results are opposite to what economic theory would suggest. Households who have some room under the deducibility cap should be more likely to invest in life insurance products. Yet they are significantly less likely to do so. Also the level of possible tax savings from life insurance purchases does not yield the expected results. The more tax savings a household could receive from an investment in life insurance products, the less likely we find him to own life insurance. The results are robust to the choice of our two possible definitions of inevitable expenditures.

Ownership by type of life insurance product

Given that we would expect savings motives to be differently connected to the different types of life insurance products, we now turn to separate analyses of the demand for whole life insurance, private pensions and term life insurance contracts. Table 6 displays the results of our basic specification applied to these three types of insurance products. Given that we can only distinguish whole life insurance and private pension contracts in the 2003 cross section of the EVS the sample is restricted accordingly.

We first look at the influence of children and marital status: While the results look comparable for whole life insurance and term life insurance contracts, the results for private pensions look quite different. Children in the household increase the probability of holding term and whole life insurance, while the effect on private pensions is mixed and largely insignificant. Comparing the influence of the number of children we find the demand for whole life insurance to be reduced once a family has three or more children. At the same time, the probability of holding term life insurance is continually rising in the number of kids. We take this as evidence that a bequest motive and insurance for the children induce demand for insurance products with a term life component. Further, there seems to be a substitution between whole life insurance and term life insurance depending on the number of children which might be related to the available financial resources.

Next, we find a stable and positive effect of marital status on the demand for whole life insurance. The estimated effect is largely independent of the existence and number of children. The effect of marriage on the demand for term life insurance is mixed and only significantly positive if no children are present. Last, private pensions seem to be less popular among married households. Like in the case of whole life insurance, this effect changes only little depending on

[24] The appendix includes a detailed overview over the samples employed for the different specifications.

the existence and number of children in the household. The term life component being the main difference between whole life insurance and private pensions one might consider these results evidence in favor of a bequest/insurance motive. Yet the fact that term life insurance products do not benefit accordingly may be evidence against such a savings motive. Another explanation might be that married households are more willing to accumulate wealth in the first place and especially so in the presence of children.

Table 6: Probit regressions for life insurance ownership by type (2003)

	ownership of …		
	whole life insurance	private pensions	term life insurance
HoH male (D)	-0.002	-0.010	0.002
	(0.37)	(2.37)*	(0.46)
unmarried, 1 child	0.035	0.014	0.041
	(3.38)**	(1.72)	(4.20)**
unmarried, 2 children	0.037	-0.009	0.079
	(2.55)**	(0.83)	(5.81)**
unmarried, 3+ children	-0.048	0.005	0.091
	(1.99)*	(0.31)	(4.15)**
married, no children	0.022	-0.017	0.027
	(2.39)*	(2.59)**	(3.58)**
married, 1 child	0.041	-0.014	0.050
	(3.77)**	(1.88)	(5.69)**
married, 2 children	0.051	-0.029	0.075
	(4.57)**	(4.25)**	(8.07)**
married, 3+ children	0.029	-0.038	0.072
	(2.27)**	(5.21)**	(6.82)**
HoH self-employed (D)	0.068	0.071	0.022
	(6.41)**	(8.10)**	(2.72)**
HoH civil servant (D)	0.015	-0.028	0.007
	(1.88)	(5.31)**	(1.31)
above contr. cap (D)	-0.039	-0.012	-0.010
	(2.68)**	(1.32)	(1.10)
income above the contr. cap (in MEUR)	0.461	0.051	0.022
	(1.27)	(0.22)	(0.10)
mortgage (D)	0.025	-0.025	0.059
	(3.23)**	(4.57)**	(10.10)**
debt share (real wealth)	0.043	-0.002	0.052
	(3.37)**	(0.25)	(6.09)**
average tax rate	0.264	0.125	0.106
	(4.20)**	(5.38)**	(3.89)**
Observations	42680	42680	42680
Pseudo R^2	0.1098	0.0724	0.1058

Note: The t-statistics in brackets are calculated using heteroskedasticity consistent estimators.
** denotes significance at the 5 percent level, ** at the 1 percent level*

We next turn to the influence of a possible old age savings motive. Given, that term life insurance does not include capital accumulation, we would expect our proxies for the old age

provision needs to have no effect on them at all. We find households with a self-employed household head to be significantly more likely to hold all kinds of life insurance. In support of the above hypothesis the effect of self-employment on the probability of term life insurance ownership is a lot smaller.[25] The effect of a civil servant household head also differs across products. While those products with a term life component tend to be more spread among civil servants, private pensions are significantly less popular among them. For households with an income above the contribution ceiling our evidence is again mixed. Overall, our results again show little support for our theoretical considerations: where the effect of income above the contribution ceiling has the expected sign, it remains statistically and economically largely insignificant. Additionally, the level effect of being at or above the contribution ceiling is negative (though mostly insignificant) for all three products.

Returning to the influence of housing debt, we find strong evidence in favor of our hypotheses: we find households with outstanding mortgages to be more likely owners of term and whole life insurance contracts. Both products include a term life component – which is frequently required to receive a home loan in Germany. Also, the probability of holding whole life insurance and term life insurance increases in the share of debt on the household's real wealth. Somewhat striking is our finding that households with a home loan are less likely to hold wealth in a private pension contract. Given that whole life insurance contracts and private pensions are quite similar products except for their term life component, households with a home loan might just pick the two-in-one package among the otherwise close substitutes. Another reason might be that households consider their home a substitute for additional old age provision and therefore reduce their additional savings in a private pension contract. This finding is in line with Schunk (2007) who investigates to what extent different forms of savings are competing with each other.

Finally, we consider the effects of tax incentives and find our hypotheses supported for all types of life insurance products. As for the pooled sample, we find the average tax rate to be one of the most important predictors for life insurance ownership. The effect is stronger by an order of magnitude for whole life insurance products; hence our results support the often raised claim that especially whole life insurance owed much of its popularity to its favorable tax treatment.

[25] A possible explanation for the positive coefficient may be the fact that the self-employed do not have dependent's insurance unless they are voluntarily insured in the public pension system. Hence the self-employed dummy may capture not only the need for additional private old-age provision.

Wealth in life insurance policies

What we have investigated so far is only the question of whether or not a household decides on the purchase of a life insurance product or not. To gain further insight, we look at how much households invest and – resulting from this – how much wealth they accumulate in insurance products. We first look at wealth levels invested in whole life insurance products and private pensions. Given that we can only distinguish the two types of products in the 2003 cross-section of the EVS, we again restrict the sample accordingly. We employ a Heckman model to allow for selection effects. For part of the exclusion restrictions we pick the age-variables, the time-effects and the dummy for households above the contribution cap. Although wealth and contributions can be expected to vary with age, we expect both to be captured by income and wealth effects. For part of the dummy for households above the contribution cap theory would suggest, that there should be no level effect in wealth holdings or contributions for households above the cap. Instead, wealth and contributions should gradually increase in income above the cap.

Table 7 contrasts the estimation results for wealth in whole life insurance and wealth in private pensions. We find married couples without children to hold significantly more wealth in insurance products. At the same time, households with children hold lower levels of wealth in both products. The differences are significant for almost all types of families when considering whole life insurance. Significance is mixed for wealth in private pensions. Given that we are controlling for differences in total net wealth and income, it seems obvious that households with children simply spend their money differently – be it on consumption goods or on other types of investments. Hence our results clearly reject the hypothesis that households with children should save more in life insurance products to provide insurance against the early death of an earner. The same hypothesis is supported in the case of married couples with no children.

We next turn to households' old age savings motive. As expected we find households with a self-employed household head to accumulate significantly more wealth in both types of products. The effect is some 20 percent larger for whole life insurance products, but for both types of insurance the effect is statistically highly significant and of vast economic significance. Controlling for income and wealth, the average household with a self-employed head accumulates 10.000 Euros more in private pensions and 12.000 Euros in whole life insurance products. Looking at the additional savings from income above the contribution ceiling, we find the expected sign for wealth in whole life insurance and the opposite sign for private pensions. Both effects are insignificant though.

Table 7: Heckman selection models for wealth in different types of life insurance (2003)

	wealth in whole life insurance	selection	wealth in private pensions	selection
HoH male (D)	-499	-0.005	-37	-0.044
	(0.90)	(0.29)	(0.06)	(2.29)*
unmarried, 1 child	-1'394	0.087	-635	0.063
	(1.51)	(2.99)**	(0.75)	(1.90)
unmarried, 2 children	-2'990	0.123	-2'337	-0.042
	(2.22)*	(2.96)**	(2.20)*	(0.86)
unmarried, 3+ children	1'908	-0.146	-1'497	0.021
	(1.05)	(2.05)*	(1.11)	(0.29)
married, no children	2'212	0.075	1'929	-0.071
	(2.82)**	(2.54)*	(1.94)	(2.22)*
married, 1 child	-1'431	0.116	-1'244	-0.056
	(1.38)	(3.68)**	(1.21)	(1.65)
married, 2 children	-2'976	0.156	-2'848	-0.134
	(2.92)**	(4.82)**	(2.50)*	(4.08)**
married, 3+ children	-4'516	0.080	-3'607	-0.184
	(4.04)**	(2.24)*	(3.03)**	(4.92)**
HoH self-employed (D)	11'953	0.245	9'815	0.286
	(8.00)**	(7.60)**	(5.96)**	(8.51)**
HoH civil servant (D)	-936	0.026	-3'265	-0.135
	(1.23)	(1.05)	(5.17)**	(5.24)**
above contr. Cap (D)		-0.137		-0.059
		(3.66)**		(1.38)
contr. Cap * inc (in MEUR)	45'718	1.491	-32'382	0.227
	(1.29)	(1.37)	(1.02)	(0.21)
mortgage (D)	-5'389	0.050	-5'954	-0.120
	(6.30)**	(2.26)*	(5.10)**	(4.32)**
debt share (real wealth)	13'371	0.136	7'814	-0.011
	(9.28)**	(3.68)**	(4.32)**	(0.23)
average tax rate	-4'367	1.029	10'345	0.546
	(1.13)	(8.18)**	(3.30)**	(5.49)**
mill's				
lambda	-23'789		13'270	
	(11.24)**		(6.30)**	
rho	-0.67		0.58	
Observations	42'680	42'680	42'680	42'680

*Note: The variance-covariance matrix was estimated using nonparametric bootstrap estimation using 200 repetitions. * denotes significance at the 5 percent level, ** at the 1 percent level.*

We move on to the connection of life insurance wealth with housing debt and find households with an outstanding mortgage to hold less wealth in life insurance products. At the same time, the level of wealth clearly increases in the ratio of home loans to housing wealth. We have pointed out before that many households will need to provide some kind of term life insurance to get a home loan approved. Private pensions do not include such term life component and this is mirrored in our results. Households with an outstanding mortgage are less likely to hold private pensions and their probability to hold private pensions also does not increase with the share of debt on the home. At the same time a higher share of debt always requires additional loan

securities. Both, wealth in private pensions as well as wealth in whole life insurance contracts, can serve this purpose. The positive coefficients for the share of debt for both types of insurance support these theoretical considerations.

Last we turn to the effects of the tax rate the household is facing. While the Heckman model confirms our previous results that the probability of accumulating wealth in life insurance products increases in the household's tax rate, we are somewhat surprised by the result, that only private pension wealth increases significantly for higher tax rates. For whole life insurance wealth the estimated coefficient is negative although not significant.

Contributions to life insurance products

Any wealth variable will comprise a history of savings and investment decisions and be influenced by the returns on capital. Also, today's sociodemographic characteristics and economic variables can only proxy the corresponding history of variables which have determined the investment decisions along the way. We therefore turn to contemporaneous investment behavior knowing that also contractual commitments of the past may play a role in the observed contributions to life insurance contracts.

Table 8 presents the results of selection models estimated for the contributions to term life insurance as well as capital accumulating life insurance products, i.e. private pensions and the various types of whole life insurance policies. Looking first at the contributions to term life insurance contracts, we find only few of the reported variables to have significant impact. There are striking differences for households with a self-employed household head and households with a civil servant head. The first spend significantly more on term life insurance products while the latter spend significantly less. Considering that families with a self-employed head are often much more dependent on their main earner and civil servants profit from dependant's pensions this finding is clearly in line with a motive to insure the family against the death of the main earner.

Somewhat surprising is the result that contributions tend to be lower for households with a home loan. Contributions rise with the share of debt on the home but this effect is not statistically significant. Last, households facing higher tax rates tend to spend more money on term life insurance policies.

Turning to our results for the contributions to whole life insurance and private pension policies we should note that the samples for the two regressions displayed in table 8 are not the same. The sample for the second regression is restricted to households where we could calculate the possible tax savings from contributions to life insurance products – i.e. composite households and households with children who are paying income taxes are excluded.

Table 8: Heckman selection models for contributions to different types of life insurance (2003)

	contributions to term life insurance	selection	contributions to cap. acc. life insurance	selection
HoH male (D)	6.6	0.009	137.9	-0.028
	(0.19)	(0.48)	(1.51)	(1.56)
unmarried, 1 child	-167.1	0.177	-281.4	0.073
	(1.99)*	(4.44)**	(2.39)*	(1.93)
unmarried, 2 children	-129.8	0.321	357.6	0.05
	(1.14)	(6.03)**	-0.51	(0.98)
unmarried, 3+ children	-97.2	0.362	-627.8	0.176
	(0.61)	(4.69)**	(3.62)**	(2.23)*
married, no children	67.0	0.119	-388.1	-0.073
	(0.82)	(3.49)**	(2.15)*	(0.02)
married, 1 child	-48.7	0.214	-452.0	-0.017
	(0.51)	(5.95)**	(2.38)*	(0.00)
married, 2 children	-46.8	0.310	-403.9	-0.019
	(0.41)	(8.16)**	(1.81)	(0.01)
married, 3+ children	-34.0	0.296	-532.5	-0.048
	(0.28)	(7.15)**	(2.55)*	(0.01)
HoH self-employed (D)	844.2	0.095	1'955.1	0.168
	(5.58)**	(2.76)**	(6.38)**	(4.85)**
HoH civil servant (D)	-118.8	0.032	-311.9	0.052
	(2.57)*	(1.21)	(4.94)**	(2.09)*
above contr. Cap (D)		-0.047		-0.123
		(1.08)		(3.02)**
income above the contr. cap (in MEUR)	-3'152.4	0.086	13'889.3	1.549
	(1.10)	(0.08)	(2.22)*	(1.54)
mortgage (D)	-168.2	0.261	-746.4	0.118
	(2.12)*	(10.11)**	(5.40)**	(5.03)**
debt share (real wealth)	152.6	0.236	1'175.9	-0.032
	(1.54)	(5.91)**	(5.72)**	(0.89)
average tax rate	1'271.0	0.480	1'040.6	0.451
	(2.60)**	(3.38)**	(1.34)	(3.11)**
possible further tax savings (in TEUR)			-545.1	-0.051
			(2.09)*	(0.67)
deductibility cap reached				0.146
				(6.07)**
mill's				
lambda	390.1		-1464.6	
	(1.66)		(5.85)**	
rho	0.26		-0.34	
Observations	42'680	42'680	37'247	37'247

*Note: The variance-covariance matrix was estimated using nonparametric bootstrap estimation using 200 repetitions. * denotes significance at the 5 percent level, ** at the 1 percent level.*

Again, our results for the contributions made by the different family types are mixed: with one exception – unmarried households with 2 children – the estimated coefficients have a negative sign and the effects are statistically significant. While we would have expected that married households and households with children put more money into capital accumulating life

insurance products, the opposite is the case: controlling for income and wealth, single households without children contribute significantly more.

Looking at those groups of households who we would expect to save more in life insurance products for their lower replacement rates in the public pension system, we find our hypotheses supported: first, the self-employed save significantly more in insurance products. The average household with a self-employed head pays almost 2000 Euros more each year in insurance premia compared to an employee's household. Also, among employees, we find our hypothesis supported, that households above the contribution ceiling to the public pension system contribute more as their income rises. The estimated positive contribution out of additional income is statistically significant, yet economically these contributions are negligible: on average, only 1.4 cent out of every additional Euro are going into life insurance savings. Civil servants pay smaller contributions compared to other employees – again, the effect is statistically significant.

Looking at households with a home loan we find the results for contributions to be in line with the previous results for wealth levels. Households with outstanding mortgages contribute less, but their contributions rise in the share of debt on their housing property.

Finally, we inspect the influences of tax incentives. First, we find households with higher tax rates to save more in life insurance contracts. The coefficient – though economically significant – turns out to be statistically insignificant. Second, our results suggest, that the possibility to deduct contributions from taxable income is no incentive to contribute to a life insurance policy. The estimated coefficient has the opposite sign from what theory would predict and it is statistically significant.

Portfolio shares

Some of our theoretical considerations concern the portfolio share invested in life insurance products rather than wealth levels or contributions. Especially the effects of tax free interest earnings should affect portfolio choice. We conjectured that households with higher tax rates should invest a larger share of their portfolio in life insurance products as the difference in after tax returns compared to other assets rises in the actual tax rate.

We used a two stage Heckman approach as we did for the analysis of wealth holdings and contributions. Otherwise the samples and specifications employed are the same as for the pure ownership decision (table 5).

Table 9: Heckman selection models for the portfolio share invested in life insurance (pooled sample)

	(1)		(2)		(3)	
	portfolio share	selection	portfolio share	selection	portfolio share	selection
HoH male (D)	-0.012	0.010	-0.023	0.054	0.000	0.019
	(5.09)**	(1.22)	(5.94)**	(3.61)**	(0.14)	(1.74)
unmarried, 1 child	0.006	0.167			0.007	0.183
	(1.01)	(10.91)**			(0.71)	(8.23)**
unmarried, 2 children	0.031	0.114			0.017	0.117
	(3.97)**	(5.23)**			(1.32)	(3.76)**
unmarried, 3+ children	0.064	0.018			0.065	0.027
	(5.41)**	(0.56)			(3.04)**	(0.55)
married, no children	-0.021	0.225			-0.055	-0.057
	(3.84)**	(18.27)**			(5.50)**	(1.91)
married, 1 child	-0.019	0.254	-0.009	-0.026	-0.062	-0.030
	(3.13)**	(17.38)**	(3.54)**	(2.36)*	(5.25)**	(0.94)
married, 2 children	-0.017	0.334	-0.009	0.044	-0.055	-0.009
	(2.69)**	(22.12)**	(2.81)**	(3.59)**	(4.53)**	(0.28)
married, 3+ children	0.012	0.276	0.019	-0.016	-0.034	-0.056
	(1.77)	(15.60)**	(5.38)**	(1.17)	(2.68)**	(1.59)
HoH self-employed (D)	0.124	0.252	0.126	0.195	0.102	0.300
	(32.63)**	(19.28)**	(33.00)**	(12.67)**	(15.71)**	(14.57)**
HoH civil servant (D)	-0.028	-0.051	-0.031	-0.110	-0.019	0.062
	(11.66)**	(6.28)**	(13.01)**	(10.98)**	(4.84)**	(4.35)**
above contr. Cap (D)		-0.023		-0.026		-0.144
		(1.86)		(1.48)		(6.65)**
income above the contrib. cap (in MEUR)	1.302	0.788	0.852	1.113	0.972	1.758
	(7.39)**	(1.38)	(7.01)**	(2.09)*	(4.20)**	(2.31)*
mortgage (D)	0.083	0.046	0.076	0.001	0.069	0.053
	(31.26)**	(5.36)**	(30.74)**	(0.12)	(17.21)**	(3.53)**
debt share (real wealth)	-0.058	0.178	-0.056	0.208	-0.025	0.117
	(12.55)**	(10.60)**	(11.29)**	(10.45)**	(3.37)**	(4.21)**
average tax rate	-0.125	0.984	0.007	0.442	-0.172	0.697
	(4.92)**	(10.65)**	(0.31)	(4.55)**	(4.34)**	(6.96)**
smaller inc. Share 25-40%			0.004	0.016		
			(1.15)	(1.18)		
smaller inc. Share 10-25%			0.009	0.049		
			(2.47)*	(3.03)**		
smaller inc. Share <10%			0.013	0.024		
			(4.46)**	(1.75)		
deductibility cap reached						0.139
						(10.07)**
possible further tax savings					-0.021	-0.117
					(1.54)	(3.49)**
mill's						
lambda	-0.216		-0.229		-0.303	
	(22.75)**		(13.56)**		(21.00)**	
rho	-0.667		-0.740		-0.842	
Observations	267282	267282	157175	157175	116523	116523

*Note: The variance-covariance matrix was estimated using nonparametric bootstrap estimation using 200 repetitions. * denotes significance at the 5 percent level, ** at the 1 percent level.*

Looking at the effects of the tax rate on households' investment behavior, we find the expected positive effect for the selection equation. This essentially only confirms our previous results. For part of the portfolio allocation, we find a negative effect of tax rates on the portfolio share invested in life insurance wealth. The effect turns out to be statistically significant except for the second specification which is focused on married couples and effects of intra-household income inequality. Other tax favored assets might just be even more important for these households. Capital gains in stocks also remain untaxed if a certain holding period is fulfilled – to give just one example. Note that this result is robust to the exclusion of any wealth and income related variables from the regression!

The third specification concludes our analysis of tax favors towards life insurance products. As before, the deductibility of contributions turns out to be an ineffective device for the promotion of life insurance products. Overall, our hypotheses based on considerations of optimal portfolio theory are all rejected by our analysis.

VI. Conclusion

Starting from a thorough description of the German life insurance market, we have highlighted the possible usability of savings in life insurance products for different savings motives. Furthermore, we have explained the scheme of tax favors towards life insurance products and outlined its effects from a perspective of portfolio theory.

Depending on the degree to which households behave according to these theoretical considerations, we can draw some conclusions about the relevance of the various savings motives for German households and evaluate the efficiency of the existing tax incentives. At the same time, our insights about the determinants of life insurance demand in the past shed light on the possible consequences of the recent changes to the market environment. First and foremost, these changes concern the tax treatment of life insurance products. But also sociodemographic changes like the postponement of marriage and parenthood affect the market. Finally, the recent pension reforms have increased the need for additional private old age provision for German households.

The need for additional private old age provision has become the main sales argument for life insurance products in recent years. Given that all capital accumulating life insurance products in Germany can be chosen to be paid out as an annuity, they are an important candidate to substitute for the reduced public pensions. Lacking data on households' public pension claims we rely on groups of households with reduced or no coverage from the public pension system to identify the need for additional private old age provision. We consistently find the self-employed – most of which are not covered by the German public pension system – to save more in life insurance products and accumulate higher wealth levels. Apart from the self-employed, also employees with an income above the contribution ceiling will face reduced replacement rates. Our empirical evidence for the demand of this group is at best mixed. The effects of excess income on the effective replacement rate may be just too small to induce behavioral responses – especially if households receive such high incomes only for a small number of years. Otherwise, our results would imply that these households are either just fine with their lower replacement rates from the public pension system or save differently for their retirement.

The second group of savings motives we investigate concerns the insurance of the family or a bequest motive. We consider the insurance against the loss of an earner and the intention to leave a bequest – be it altruistic or not – to be equivalent for our purpose and do not make attempts to distinguish them. Our focus is on three variables – the presence, number and age of children, marital status and – among couples – the distribution of incomes. In support of our hypotheses,

we find married households and households with children to be more likely to hold whole life insurance and especially term life insurance. Especially the term life component seems to be an important aspect for the insurance of the family. Pure wealth accumulation as a way to provide for the family turns out to be much less of an argument though. Controlling for income and wealth, the average contributions of married households and households with children are estimated to be lower than for unmarried households without children. Further, the estimated wealth levels are lower in most cases where children are present. Our results for the income inequality within a couple also provide some support in favor of our hypothesis. Specifically, life insurance products are more popular among households with some income inequality. The estimated effect diminished for households with an extreme inequality of earnings though. Finally, a higher portfolio share is invested in life insurance products as the earnings inequality increases.

Third and last among the savings motives, we inspect the effects of home-ownership and mortgage debt on the demand for life insurance products. We find households with a home loan to be more likely to hold some sort of life insurance with a term life component – i.e. whole life insurance or pure term life insurance contracts. Yet contributions to life insurance products and the corresponding wealth levels are lower in households with small outstanding mortgages. With an increasing share of debt on a home the level of wealth in life insurance contracts strongly increases though. This may reflect that households have already used some life insurance wealth to pay off part of their debt. But possibly only a higher level of life insurance wealth allows households to take up an increased credit line. We would need longitudinal data to further investigate this question. Last, we look at private pensions and find the presence of mortgages to reduce the probability to hold wealth in private pensions. If households consider their home a kind of old age provision we would expect private pensions to suffer most – exactly what we observe in the data.

Assessing the effectiveness of the tax incentives, we have to differentiate between the two kinds of tax favors life insurance products enjoy in Germany. On the one hand, households do not react to the possibility to deduct contributions to life insurance products from taxable income. Instead, households with higher possible tax savings are less likely to invest in life insurance products and contribute less. On the other hand, households facing higher tax rates should contribute more to life insurance contracts and accumulate more wealth, as capital gains and interest earnings within a life insurance will typically contract remain untaxed. We find these theoretical predictions supported by our data. An exception is the portfolio share invested in life insurance products. The portfolio share turns out to decrease in the households' tax rate. One might speculate that households favor other tax favored assets. For a more solid answer to this

question we would need a complete portfolio choice model which is beyond the scope of this paper.

Generally, all of our inference on the importance of different possible savings motives is indirect – a limitation shared by the majority of the existing literature – and – strictly speaking – limited to life insurance wealth. The immense importance of life insurance wealth in Germans' financial wealth portfolio should allow some generalization of our results though. Our findings support Feldstein's (1976) predictions that households substitute between private wealth accumulation and public pension claims. An open question arising from our results concerns the old age savings of high income households. It remains unclear whether they just save differently or whether they are satisfied with the reduced replacement rates they receive from the public pension system. Germans also behave according to a bequest motive when it comes to the demand for term life insurance. At the same time our evidence concerning the accumulation of additional wealth is at best mixed like the existing literature on this aspect.

Apart from our original interest in households' savings motives and the resulting investment choices our analysis delivers some helpful insights about the future developments on the market for life insurance products: first, as the need for additional private old age provision seems to be an important factor in the demand for life insurance products, we can expect both – whole life insurance and private pensions – to benefit from the recent pension reforms. Second, also some of the changes in tax treatment towards life insurance products can be expected to have strong impact. Given that only contracts with a distinct orientation towards old age provision – specifically in the form of a compulsory annuity payout scheme – continue to receive the favorable tax treatment, we can expect to see the shift in market shares from whole life insurance products to private pensions to continue. At the same time the deductibility of contributions to life insurance contracts has shown to be irrelevant for the investment decision – at least in the current form. Hence, changes to the deductibility rules should not harm the sales of the life insurance industry. Third and last, the recent changes to the promotion of private real estate formation may have second order effects on the demand for life insurance. The size of these effects will largely depend on the first order effects – i.e. changes in the demand for real estate and changes in the financing of possible purchases. Overall, private pensions can be expected to gain from the above changes while the cumulative effect on whole life insurance products is undecided.

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Appendix

Variables and definitions

children — The EVS contains information only about the number of children in the household. We augment this measure by imputing children, whenever the amounts of child benefit allowance, maternity benefits or education benefits imply a larger number of children. While we are far from measuring the true number of children, we expect to arrive at a reasonable measure of children which are still financially dependent on their parents.

marital status — Throughout our analysis we consider a household head married whenever he is indicated to be married, no matter if the couple is living together or apart.

job status — Each person is attributed to the groups of employees, civil servants, or self-employed depending on her main source of income.

inevitable expenditures

The *tight definition* includes all compulsory contributions to the public pension system and to the other branches of the social security system (public health and long term care insurance). Further, insurance premia for private health insurance, private long term care insurance and car liability insurance are included.

The *extended definition* contains all above expenditures. It is distinct from the *tight definition* as payments to occupational pension funds, civil servants pension funds and voluntary contributions to the public pension system are added.

Control variables in the regressions

For reasons of clarity, the regression results presented in section V.2 are shortened with respect to the following control variables:

west (D) — Dummy: 1 if the household lives in the states of the former FRG

wealth — household net wealth (second degree polynomial)

inc — household net disposable income (third degree polynomial)

n_agegrp(*a*) — number of household members aged *a* to *a*+4; a ϵ [20, 25, …, 75]

Samples descriptions

Starting from a total of 267'434 observations in the pooled (1978-2003) sample, we exclude 148 households with extreme outliers of total net wealth and of the ratio of debt to assets.

regression	years	exclusions	sample size
Tables 5(1) , 9(1)	1978-2003	-none-	267282
Tables 5(2) , 9(2)	1978-2003	married couples only, possibly with children	157175
Tables 5(3) , 9(3)	1993-2003	singles or couples, possibly with children, unless the children are liable to taxation - no composite households	116523
Tables 6, 7	2003	-none-	42680
Table 8 (1)	2003	-none-	42680
Table 8 (2)	2003	singles or couples, possibly with children, unless the children are liable to taxation - no composite households	37247

Death benefit insurance, apprenticeship insurance and trousseau insurance

There are a number of special types of whole life insurance, the importance of which has strongly declined. Specifically, the EVS distinguishes death benefit insurance, apprenticeship insurance and trousseau insurance in the years 1988, 1993 and 2003. For the years 1988 and 1993, the data contains a question about the types of life insurance held in the household. For 2003, the separate amounts of wealth in the above categories allow us to infer ownership equivalently. Apart from the distinct age-pattern in ownership rates we also observe strong time effects. Death benefit insurance used to be rather popular among the elderly (see figure A-1). In 1988, as much as 30-35% of households headed by a 65+ year old owned at least one death benefit insurance contract. Within 15 years, ownership rates among the same age groups had declined by more than 15 percentage points. The absolute drops in ownership rates for apprenticeship insurance (figure A-2) and trousseau insurance (figure A-3) are smaller as their popularity has been lower to begin with. Both were held by 6-8% of the households aged 30 to 45 in 1988. Ownership rates had dropped to 2-3% in these age groups by the year 2003.

Figure A-1: Ownership rates in death benefit insurance by cohort (West Germany)

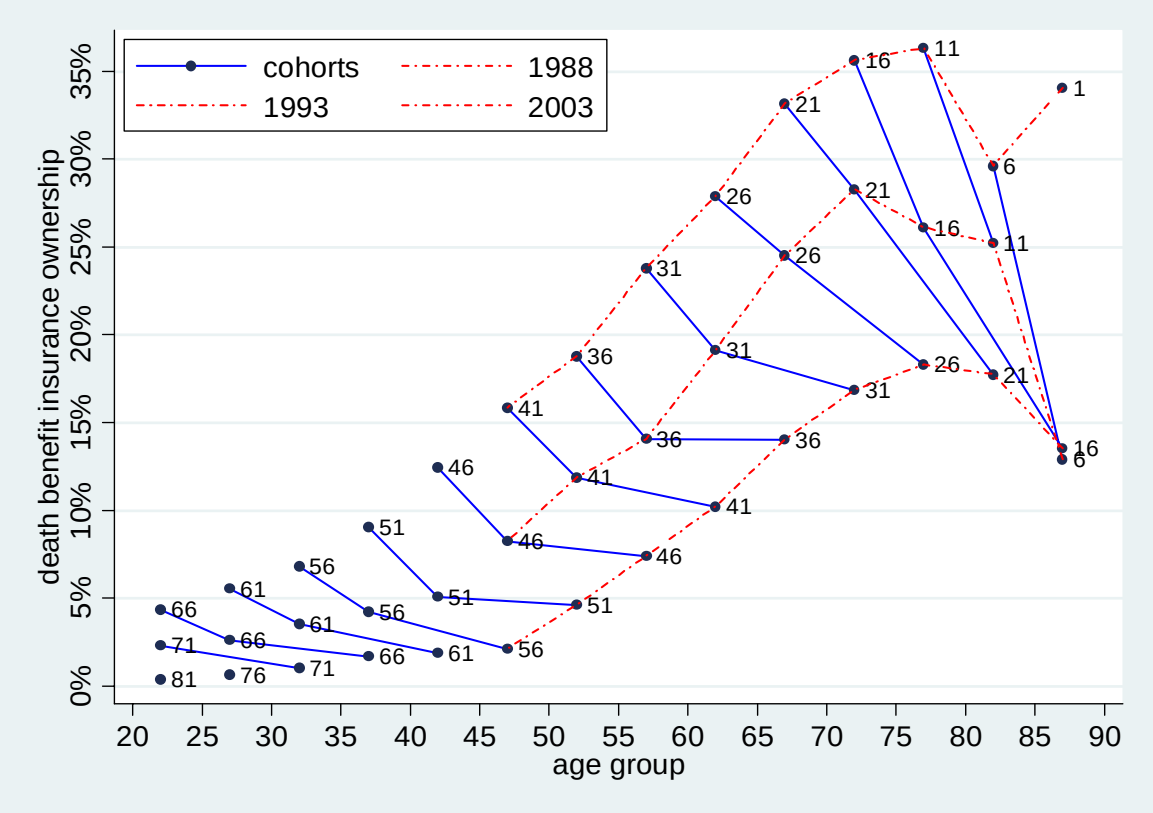
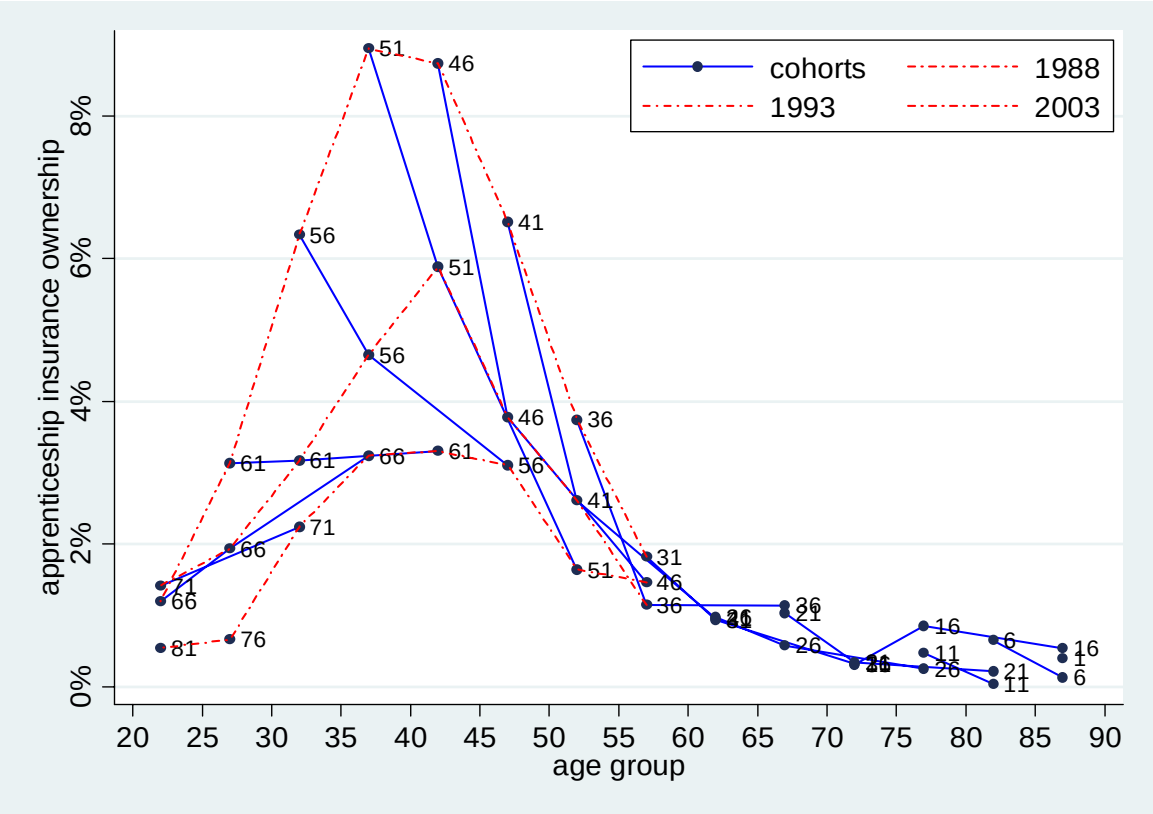
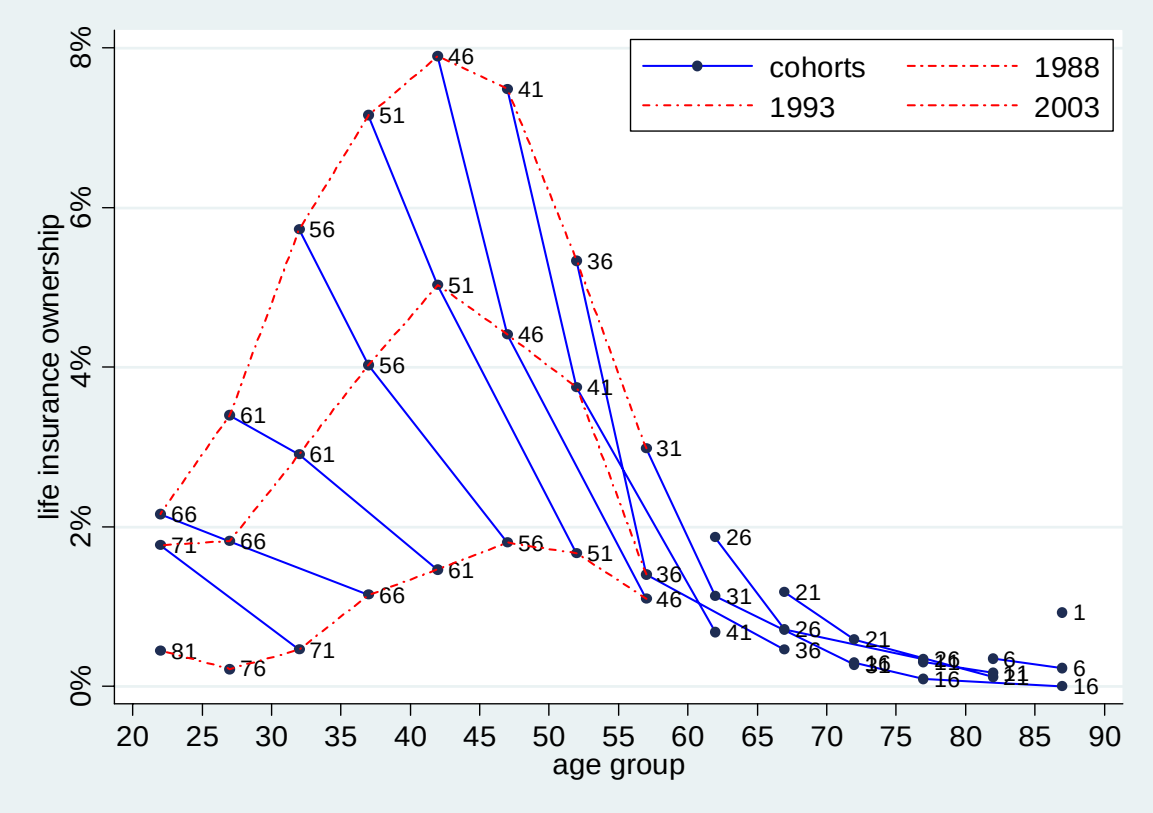


Figure A-2: Ownership rates in apprenticeship insurance by cohort (West Germany)



Source: EVS, own calculations, weighted results

Figure A-3: Ownership rates in trousseau insurance by cohort (West Germany)

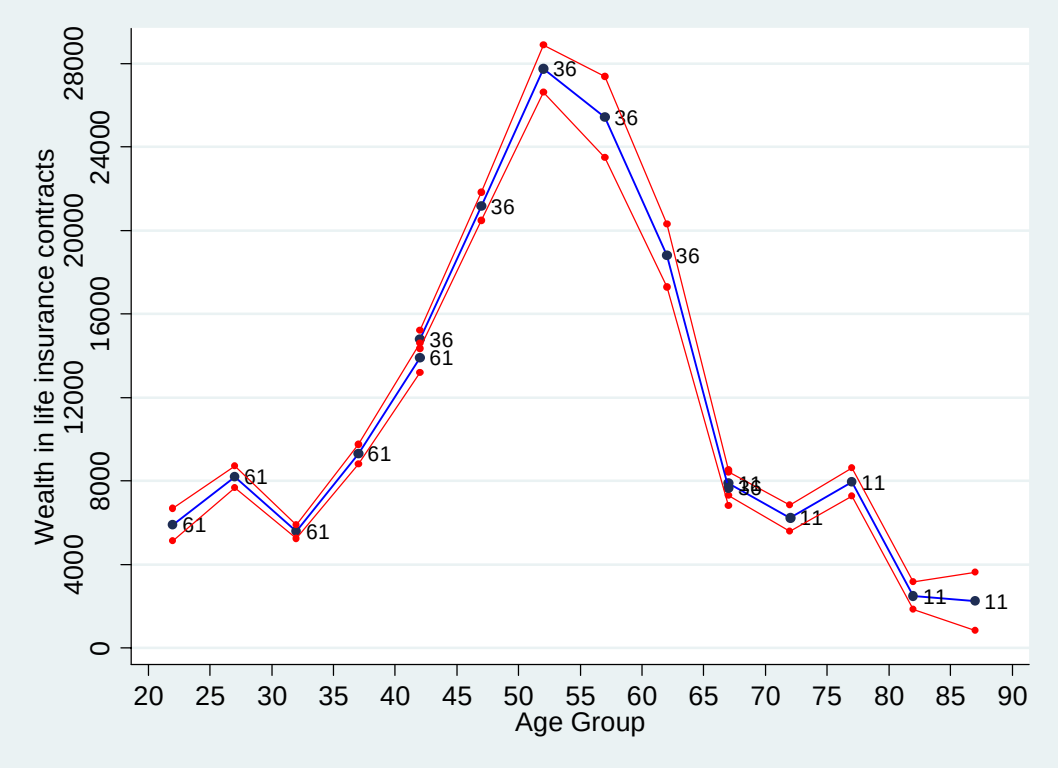


Source: EVS, own calculations, weighted results

Age-trajectories and confidence bands

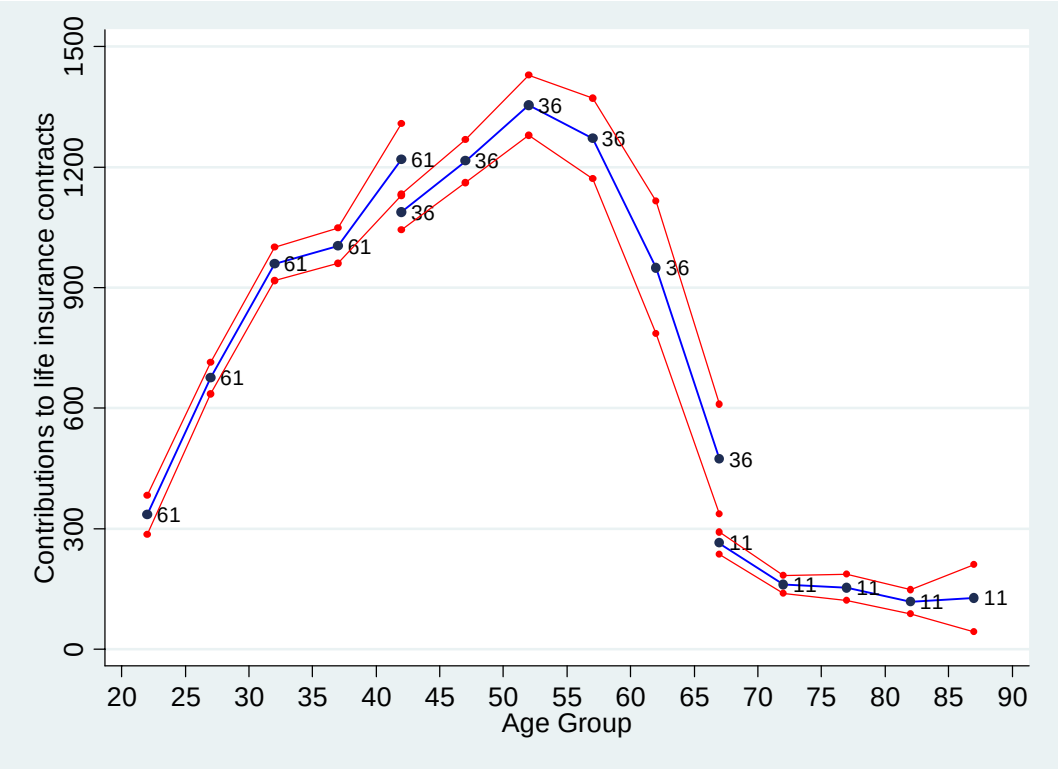
An often raised question concerns the accuracy of the estimated age trajectories – especially at old age. Figures A-4 and A-5 depict the average wealth levels and average contributions of selected cohorts over time. Each graph shows the estimated average (blue) and the 95% confidence interval around the estimated averages (red). The confidence bands get wider for the oldest age-group – households with a household head aged 85 to 89. Note that this age-group still contains between 200 and 300 observations for each cohort we observe up to such a high age.

Figure A-4: Cohort wealth trajectories with confidence bands



Source: EVS, own calculations, all values in 2001 Euros, weighted results

Figure A-5: Cohort trajectories in contributions with confidence bands



Source: EVS, own calculations, all values in 2001 Euros, weighted results

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