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Health and long-term care insurance wealth in Austria

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Abstract

Estimates of social insurance pension wealth are available for a number of Western economies, including Austria for the year 2017. Such wealth may be compared with conventional wealth in terms of size and distribution and when we add such estimates to measures of wealth in the conventional sense, we arrive at measures of augmented wealth. In this paper, we estimate health and long-term care insurance wealth in Austria and add that to conventional wealth estimates for Austria to achieve a further measure of augmented wealth. To our knowledge, this is the first attempt worldwide to do this. The resulting magnitude of health and long-term care insurance wealth is substantial, namely EUR 238,000 at the household level. It is comparable in scale to both pension insurance wealth (EUR 245,000) and net wealth in the conventional sense, i.e. property plus financial wealth minus debt (EUR 250,000). As regards distributive characteristics, health and long-term care insurance wealth is rather equally distributed (Gini coefficient of 0.31), compared to pension insurance wealth (0.45) and conventional wealth in Austria (0.73). The Gini coefficient for the new augmented wealth distribution (conventional wealth plus health and long-term care insurance wealth) is 0.47.

JEL classification: D31, H51, I13
Keywords: net wealth, health insurance, long-term care, augmented wealth, HFCS

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Non-Technical Summary

This study presents, for the year 2017, measures of health and long-term care insurance wealth in Austria and conventional wealth figures augmented by these.

This endeavor builds on a relatively new strand of economic research which has developed around the past two decades and which is targeted to "augment" conventional wealth measures – typically based on the narrow concept of "marketable wealth" – by the inclusion of, very broadly spoken, future entitlements promised by the welfare state.

So far, more or less exclusively pension insurance entitlements – so-called "pension insurance wealth" – have been in the focus of these efforts.

In the spirit of this, a project was initiated at the Austrian National Bank aimed at enriching conventional wealth reporting for Austria, as it is, for example, carried out in household surveys like the Household Finance and Consumption Survey (HFCS), with wealth measures based on the augmented wealth concept. So far, this has yielded estimates of pension insurance wealth and social housing wealth for the household sample of the HFCS as of year 2017. Particularly pension insurance wealth turns out to be quite significant and comes close to the EUR 250,000 of net wealth in the conventional sense which are reported at the household level.

The paper at hand moves now one more step further and includes health and long-term care insurance entitlements in this augmented wealth accounting exercise. To our knowledge, this is the first attempt worldwide to do this. Austria has, also by international standards, a quite significant system of health insurance and long-term care, which, therefore, seems to be a natural candidate for the endeavor.

The resulting insurance wealth magnitudes turn out to be quite substantial and of a scale fairly comparable to measures for net wealth in the conventional sense and pension insurance wealth. For the average contributor to the Austrian social insurance scheme for non-civil-service-status employees, we estimate net health and long-term care insurance wealth at some EUR 100,000. When we aggregate to the household level across the HFCS sample, we arrive at an average amount quite close to the EUR 250,000 reported for net wealth in the conventional sense and pension insurance wealth.

Household health and long-term care insurance wealth is also, again quite in line with pension insurance wealth, more equally distributed than conventional financial and property assets, and inequality measures for net wealth augmented with it are significantly lower than for net wealth in the conventional narrow sense. The Gini coefficient for health and long-term care insurance wealth amounts to 0.31, which is far below the 0.73 reported for conventional wealth and still a good deal below the 0.45 reported for pension insurance wealth. Augmenting wealth with pension insurance wealth reduces the Gini coefficient from 0.73 to 0.53, while augmenting it with health and long-term care insurance wealth reduces it to 0.47.

Contents

1. Introduction

The distribution of personal wealth is in any country, at any time, an ever-recurring topic of discussion, but particularly at times of high inflation, high tax burden and low growth experience. Yet, for a productive discussion it is crucial to have the policy discourse start from a data set that is analytically comprehensive and comparable and to apply well-known statistical measures in an unbiased manner. To this end, a project was initiated in 2020 at OeNB – the Central Bank of Austria – that proposes

(1) to use the concept of augmented wealth for the construction of the data for analysis, as it includes in addition to the conventional wealth components – i.e. financial assets and property minus debt – also the unfunded but wealth-like employer and government entitlements such as pensions, health and long-term care and housing support which are particularly relevant for the lower (income and) wealth strata of individuals and households,

(2) to provide sound estimates of the most relevant non-marketable and government-provided social entitlements, and

(3) to apply adjusted statistical measures to assess the augmented wealth distribution.

Estimating augmented wealth, and in particular its distribution vis-à-vis that of traditional wealth, is still a relatively young research branch that profits from the increasing availability of microdata and the capacity of interlinking.

There are at least four motivations why the concept of augmented wealth, the estimated data and the ensuing analyses are relevant for policy considerations. Augmented wealth is particularly important for:

(1) A holistic view of wealth. Augmented wealth aims to capture a fuller picture of economic well-being by including non-marketable assets that significantly impact financial security and quality of life.

(2) Policy and planning. By considering augmented wealth, policymakers can better design social programs and economic policies that address the needs of different population segments, especially those with lower marketable wealth.

(3) Economic behavior. Understanding augmented wealth helps in analyzing consumption, saving, and labor supply decisions more accurately, as these decisions are influenced by both marketable and non-marketable wealth.

(4) Equity and Distribution. Including augmented wealth provides a less biased view of wealth distribution, highlighting the importance of social benefits and public entitlements in reducing inequality.

In the current OeNB project we focus on both the size and the distributive characteristics of augmented wealth. In a first paper under the project, Knell and Koman (2022) augmented the marketable wealth size and distribution as traditionally estimated in the Austrian (and EU-wide) Household Finance and Consumer Survey (HFCS) for 2017 by detailed estimates of the stock value of pension commitments and its distribution for the same year. The same HFCS survey was also used as reference data to provide estimates for social housing wealth and its distribution in Austria for the same year (see OeNB REFFO, 2024).

In this paper, we aim to estimate both a measure and the distribution of health and long-term care insurance wealth in Austria. To our knowledge, this is the first attempt worldwide to undertake this effort. The reason why this may not yet have been attempted before could be grounded in the complexity of the endeavor and data limitations. We, however, believe that one simply has to start somewhere; it is our strong prior that health and long-term care insurance wealth is likely to be quite sizable in monetary terms and that its distribution is (at least, but most probably not only in Austria) more equitable than that of wealth in the conventional sense and that, hence, an augmented wealth estimation provides a more meaningful picture of the distribution.[1]

For reasons of consistency and comparability, we closely align our methodology and underlying assumptions with the work of Knell and Koman (2022) on pension insurance wealth, which served as the starting point and the benchmark study for the Bank's entire augmented wealth project series, and we will put our results into ongoing comparison.

The paper is organized as follows: In section 2, we briefly review the key concepts involved: (1) wealth in the conventional sense, (2) "augmented wealth", which is defined to include, or to be "augmented" by, a measure of (3) social insurance wealth, and our specific focus in this paper, (4) "health and long-term care insurance wealth".

We provide a brief overview of the augmented wealth literature and explain how the paper is intended to fit into this context. Although the literature has long established the concept of social security or insurance wealth (or liability), it has, until now, primarily been limited to pension insurance entitlements. However, health and long-term care insurance does also have significant distributional effects, which have so far been well documented in the literature at the *income level*. We simply propose to take the analysis one step further by building the bridge to the *wealth level* and by evaluating the distributional effects also there.

Section 3 briefly summarizes the institutional background and describes the system of health insurance and long-term care in Austria, the system which is in the focus of our calculations and for which we want to compute a measure of insurance wealth.

In section 4, we address and describe the methodology and the data which we use in our calculations: Subsection 4.1 deals with the methodology. Subsection 4.2 presents the data source on the benefit side, basically the "System of Health Accounts", a "satellite account" to the System of National Accounts. Finally, subsection 4.3 deals with the data sources on the contribution side. To arrive at a valid or net insurance wealth figure, we need data about both received benefits and paid contributions.

Section 5 presents our results in some detail. Subsection 5.1 presents health and long-term care insurance wealth figures at the macro-data level for the average contributor to the employees' social

[1] We do not claim that these three "pillars" of our augmented wealth project series, pension insurance, health and long-term care insurance and social housing support, cover the topic completely. They just offered themselves as politically particularly relevant and a sort of "starting point" in the Austrian context.

Quite a number of possible extensions come to mind: Unemployment insurance and accident insurance as further branches of social insurance, and also even social welfare or social assistance (*"Sozialhilfe"*, as it is called in Austria and Germany), the last, tax-financed safety net of social support already outside the narrower core of social insurance. One might even take into consideration the whole bulk of services which is included into what we call "public consumption" in national accounts terminology. This would lead pretty far beyond social insurance and social benefits and, boldly spoken, "redistribution in favor of the poor", and would finally also take into account government services for the protection of property and "redistribution in favor of the rich". The concept of augmented wealth is broad enough…

insurance scheme. Subsections 5.2 and 5.3 move from the individual to the household level: Based on the macro-level estimations in subsection 5.1, subsection 5.2 presents household insurance wealth measures for several stylized household constellations. Subsection 5.3 finally presents figures and statistics on household health and long-term care insurance wealth for the household micro-data sample of the Austrian Household Finance and Consumption Survey (HFCS) of the same year, i.e. 2017.

To put it briefly upfront, our key findings are that health and long-term care insurance wealth is both quite substantial in size and quite notably redistributive. The average per household value amounts to EUR 238,353 and is approximately of the same magnitude as measures of net wealth in the conventional sense (EUR 252,272) and pension insurance wealth (EUR 245,051). And with a Gini coefficient of 0.31, health and long-term care insurance wealth is far more equally distributed than net wealth in the conventional sense, which exhibits a Gini coefficient of 0.73, and still a good deal more equally than pension insurance wealth, which is distributed with a Gini coefficient of 0.45. Augmenting wealth by pension insurance wealth reduces the Gini coefficient from 0.73 to 0.53, whereas augmenting it by health and long-term care insurance wealth reduces it to 0.47.

In section 6, we provide a summary and draw conclusions. We also address a number of for-the-time-being limitations of our work, which we really consider a first step into this special new field of research, and summarize several areas open to improvement and further conceptual broadening that we encountered along the way.

2. The concepts involved: wealth, augmented wealth, social insurance wealth, and health and long-term care insurance wealth

The concept of *wealth* is typically based on the concept of "marketable wealth". It is defined as the sum of financial and real assets, minus outstanding debt. This concept of wealth is commonly used in household surveys like the Household Finance and Consumption Survey in Austria and the other EU member countries.

However, interest in a broader concept of wealth has been on the increase. Such a concept of *"augmented wealth"* aims at including non-marketable entitlements, such as entitlements arising in particular from social insurance. The term "augmented wealth" dates back to Wolf (1996) and was made popular by Davies and Shorrocks (2000).

The first candidate were public pension entitlements and the aim was to construct a *pension insurance wealth* figure which quantifies the present value of public pension entitlements.

Inevitably, this sparked a discourse and even dispute about the question: *What is the "right" concept of wealth?* The idea of augmented wealth came up against theoretical as well as practical reservations.

To start with, wealth, in the purest sense of the word, is unconditionally, instantaneously, and imperishably available to its owner, even beyond death. In other words, it is and remains available and freely disposable under just any circumstance and can also be transmitted at discretion, during one's lifetime or through inheritance. As to social security entitlements, this is obviously not – or at least not fully – the case. And even less so when we think of future public consumption prospects, which might be a candidate for a further step of augmentation.

Moreover, where to draw the line once you have made up your mind about opting for the augmented wealth concept? There are entitlements and benefits which evoke fewer reservations and others which evoke more.

Finally, the valuation of marketable wealth can be based on readily available market prices. In contrast, measures of augmented wealth are more or less elaborate estimates which require a number of detailed and inevitably disputable assumptions. Pension insurance wealth, for example, is usually defined as the present value of future pension benefits. Its valuation requires assumptions about discount rates, mortality, the probability of survivor benefits, the probability and impact of pension reforms, and future tax legislation. Plus, if the insurance wealth measure is not confined to accrued-to-date pension rights, also assumptions about future income and contribution rates.

But there still is a good rationale for calculating augmented wealth measures. It becomes most evident in international wealth comparisons. Namely when countries with a well-developed public pension system are compared with countries whose pension systems rely more on private retirement provision and, hence, private savings. Conventional wealth measures and wealth comparisons will underestimate the relative wealth status of citizens residing in the first group of countries. Conventional wealth will exclude a substantial proportion of their savings and their accumulated wealth – public pension entitlements through forced savings (see Fessler and Schürz, 2018). The "unaugmented" comparison would be biased, and the augmented wealth measure, if constructed properly, can enhance the comparison. And this argument holds not only in the case of pension insurance.

It is, after all, a trade-off, and a challenging task, but, hopefully, not a Sisyphean task. To get a more complete picture, you must also include the incompletely visible parts of the picture and try to trace the less invisible parts, as carefully as possible. In turn, always keep in mind and never conceal that the newly included wealth items have features which distinguish them from "wealth in the purest sense of the word". Be explicit that such items are based on estimates and assumptions which might be disputable and are, therefore, up for discussion.

Knell and Koman (2022) summarize the literature on the topic that comprises both estimates of the macroeconomic size and the microeconomic distribution across individuals and/or households. Such pension insurance wealth has been calculated by Mazzaferro and Toso (2009) for Italy, Rasner et al. (2013) and Bönke et al. (2019) for Germany, Bönke et al. (2020) for Germany and the USA, Sabelhaus and Volz (2020) and Catherine et al. (2020) for the USA, Kuhn (2020) for Switzerland, Longmuir (2021) for Australia and, finally, by Knell and Koman (2022) for Austria for the first time. Several other papers focus for the most part only on special subgroups of the population.[2]

A while back, papers focused on overall macroeconomic estimates of pension insurance wealth, with Munnell (1974) and Feldstein (1974) zeroing in on the effects of "social security wealth" on private saving efforts. Corresponding macro estimates for Austria stem from a Feldstein seminar at the University of Vienna in 1980 (Holzmann, 1981). Beside estimates of the asset side of pension wealth, international organizations also paid attention to estimating the liability side of pensions for governments. For instance, the IMF, OECD and the World Bank started doing this for advanced, emerging, and developing countries. From such a perspective, Holzmann et al. (2001) estimate the present value of future budget liabilities in percent of GDP for some 50 developing countries. Such liability estimates in more disaggregated form are also important should one envisage a pension

[2] Maunu (2010), Crawford and Hood (2016), Wolff (2015), Jacobs et al. (2021), Cowell et al. (2017) and Roine and Waldenström (2009).

reform where an unfunded pension scheme is fully or partially replaced by a funded scheme (Holzmann and Jouston, 2012).

So, while the literature has already established the concept of social security or insurance wealth (or liability), the concept has to date essentially been restricted to pension insurance entitlements.

In this paper, we try to extend the concept of social security wealth or social insurance wealth to the area of *health and long-term care insurance*. This implies that we mostly also include *benefits in kind* in the augmented wealth concept, which is new territory and a further step of augmentation. As already mentioned above, for reasons of consistency and comparability, methodology and underlying assumptions are as closely as possible in line with Knell and Koman (2022); our date of valuation is the same: January 1, 2017.

Although we are entering new territory in the analysis of *wealth distribution* here, the inclusion of accrued health and long-term care benefits in distribution analysis has already become a subject of discussion and, occasionally, also already a subject of consideration at the *income level*; the notion and the concept of health and long-term care insurance wealth is, therefore, also against *this* background, not completely far-fetched, but rather one further step in a direction that research has already been heading towards – moving from the income to the wealth level.

Kaestner and Lubotsky (2016), for example, have provided an introduction to and reviewed the literature on the topic up to our date of valuation, with a focus on the USA. They presented illuminating measures of inequality where they added imputed values of Medicare or Medicaid to family income: Following Burkhauser et al. (2012, 2013), they assigned to each recipient average Medicare expenditures by year and state and average Medicaid expenditures by age, year and state. The result was compelling; the ratio of the 90th to the 10th percentile of after-tax family income in 1995 falls from 6.6 to 5.0, or by 24%. The effect is even slightly larger for 2012, when the ratio decreases from 7.9 to 5.6, or by 29%. Not surprisingly, including Medicare and Medicaid benefits overproportionately impact the lower half of the income distribution.

Burkhauser et al. (2019) also illustrated that official measures cannot capture levels and trends of poverty properly, as long as the measures do not consider income-supporting government transfers in cash and in-kind benefits – which are, as a matter of fact, to a considerable extent health insurance benefits. They show that, while the official poverty rate fell from 19.5% in 1963 to still 10.5% in 2019, a full-income poverty measure rate, which does also take account of, particularly, government cash transfers and health and other transfers in kind, would have fallen from 19.5% to 1.6%. This makes indeed a remarkable difference and leads to a rather different policy evaluation, leading even as far as to the conclusion that President Johnson's "war on poverty" is actually largely over and has finally been won (although, however, not yet by helping low-income Americans become self-sufficient, as President Johnson actually envisioned, see CEA, 2019). Recent recommendations on poverty measurement explicitly suggest augmenting income measures with health insurance benefits (see, for example, ITWG, 2020).

Bittschi (2023) shows the significant impact that health benefits have on the income distribution in Austria, our country of investigation. For the poorest 10% of the population, in-kind benefits from the public health system – long-term care benefits are excluded here – amounted in 2019 to almost one third of total gross income (defined as the sum of market income, gross statutory pensions and other public cash benefits). The amount is already significantly lower for the second decile (around one-quarter), and declines steadily for the other deciles, reaching around 4% for the top decile.

Hence, to sum up, the literature has already well documented that health and long-term care insurance has significant effects on the income distribution. No attempt, however, has yet been made to aggregate over the life cycle, move to the wealth level, and construct measures of insurance wealth and augmented wealth, just as has already been done repeatedly in the case of pension insurance. This paper aims to contribute towards bridging this gap.

It may be argued that health and long-term care insurance is less enriching to wealth analyses than pension insurance, because even liberal welfare states predominantly rely on public finance, and so one key advantage of the augmented wealth concept, the improvement of international wealth comparisons, simply will not be there anymore in the case of health care.

But, this being said, it is still of high interest to get a feel for the quasi-wealth magnitudes which are involved through health and long-term care insurance, both in absolute terms and in comparison with wealth in the conventional sense and pension insurance wealth, and how deeply it affects the overall distribution, isn't it? On a priori grounds, and from what we can infer from the above-described distributional effects at the income level, health and long-term care insurance wealth should be of considerable size, and it should have a big and clearly smoothening effect on the overall wealth distribution – and to put it only briefly upfront, this hypothesis will be confirmed.

3. Health insurance and long-term care in Austria

Austria has – also by international standards – a quite generous system of health insurance and long-term care.[3] Social health insurance provides comprehensive coverage for almost the entire population living in Austria, which is also entitled to long-term care benefits. The coverage includes non-contributing family members, children and other people who are, or have been, neither employed nor running an independent business.

Most health and long-term care benefits are provided in kind, although there is also a number of cash benefits, including, most prominently, sickness benefits, maternity benefits, patient travel allowances, and long-term care allowances earmarked for long-term care-related costs.

Currently health insurance coverage is provided by three independent insurance funds which are governed under the overall social insurance umbrella organization, the "Federation of Austrian Social Insurances" (*"Dachverband der Sozialversicherungsträger"*). Contribution to one of these health insurance funds is mandatory, and it is not possible to switch between them, neither before nor after retirement. In 2016, the base year for our estimations, about 77% of the population, including most employees und unemployed people, were covered by the "Austrian Health Insurance Fund" (*"Österreichische Gesundheitskasse",* or *ÖGK* for short). About 12% were covered by the "Social Insurance Institution for the Self-Employed" (*"Sozialversicherungsanstalt der Selbständigen", SVS*), including the self-employed in trade and industry and farmers. Some 11%, including civil service employees, both with and without civil servant status, employees of the federal railways and miners, were covered by the "Insurance Institution for Civil Servants, Railways, and Mining" ("*Versicherungsanstalt öffentlich Bediensteter, Eisenbahnen und Bergbau", BVAEB)*. These shares are somewhat trending to shift; between 2016 and 2022 from 76.7% down

[3] For a comprehensive overview, see Hofmarcher (2013).

to 75.9% (ÖGK), from 12.4% up to 12.6% (SVS), and from 11.0% up to 11.5% (BVAEB), respectively (Federation of Austrian Social Insurances, 2017a and 2023).

Austria's health spending levels are comparable to other wealthy European countries, at the upper end, though. In 2016, public health spending made up about 16% of total public spending or 8% of GDP (including investment expenditures of 0.7% and 0.4%, respectively). And public health spending is on a clear upward trend: By 2022, it had increased to 16.9% of total public spending and 9.0% of GDP, respectively.[4] Private health spending amounted to 5.8% of private consumption or 3% of GDP in 2016 (also including investment expenditures of 0.7% or 0.4%) and is evolving more moderately. By 2022, it had reached 5.4% of private consumption or 2.8% of GDP (Statistics Austria, 2024).

Both health and long-term care in Austria are funded through a mix of sources, which are listed here, in descending order, by magnitude: income-related contributions to compulsory social health insurance schemes, government budget transfers out of the general tax revenue, self-payments of patients out of their own pockets as well as voluntary, private health insurance schemes. The funding of health care in the stricter sense relies predominately on social insurance contributions, namely by more than half to be precise. In contrast, long-term care benefits are largely financed out of the government budget, namely approximately three-quarters. In fact, there is no such thing as a special social long-term care insurance contribution in Austria, and private insurance companies do not yet operate in this field either. Patients' out-of-pocket payments account for almost one-fifth of total expenditure, and no less than almost one-quarter in the field of long-term care, where they are the second most important source of funding. Flows of funds are shown in proper detail in section 4.2.

Health insurance contribution rates are determined by law and have been adjusted frequently over the years. This has resulted in a rather diverse contribution regime. It can be broadly summarized as follows – please note that we refer here to the legal situation in 2017, our "year of valuation": The contribution rate amounts to 7.65% in the social insurance schemes for self-employed people[5] and the great majority of employees (in their case 3.87% are labelled "employee contribution" and the remaining 3.78% "employer contribution", a distinction which is economically meaningless[6]). In retirement, their contribution rate amounts to a uniform 5.1%. Active federal, state, and local government employees with civil servant status pay 7.635% (4.1% as "employee contribution" and the remaining 3.535% as "employer contribution") and after retirement, they pay 4.9%. Federal railway employees with civil servant status pay 9.05% (4.75% as "employee contribution" and the remaining 4.3% as "employer contribution"); after retirement, they also pay 4.9%. Federal, state and local government employees without civil servant status basically are treated like civil servants as long as they are active and pay 7.635% (4.1% as "employee contribution" and 3.535% as

[4] The developments of recent years, however, were obviously significantly shaped by the COVID-19 crisis.

[5] In the meantime, a special and peculiar contribution privilege has been introduced on behalf of the self-employed; they actually now have to pay 6.8% and the remaining 0.85% are now sponsored by a federal government subsidy. Ironically, the law still explicitly calls the overall 7.65% rate the "contribution of the insured". (The same creative labeling is also used when it comes to the pension contribution rate of the self-employed.)

[6] "Employer contributions" are, from an economic perspective, simply a part of the actual gross salary (as which they are actually also treated in national accounts statistics) and an (additional) contribution from the employee, and the meaningless and even misleading legal distinction between "employee" and "employer" contributions is, after all, only there to politically camouflage the amount of the employee's true contribution. Apart from that, there is no raison d'être in it whatsoever.

"employer contribution") and similar to private-sector employees after retirement, paying then also 5.1%.[7]

Contributions are paid from pre-tax earnings up to an upper threshold, which is adjusted annually according to the average wage increase. On an annual basis, this threshold amounted to EUR 69,720 in 2017.

4. Methodology and data

The following three subsections discuss the methodology and data basis used in our calculations of health and long-term care insurance wealth.

4.1 Calculating health and long-term care insurance wealth

In line with the existing social insurance wealth literature, we define *"health and long-term care insurance wealth"* as the present value of health and long-term care benefits an individual or a household of individuals will receive over the remaining lifetime, individuals specified, at least, by age and gender.

As already mentioned, however, this literature has so far focused almost exclusively on calculating pension insurance wealth; and the methodology suitable for pension insurance cannot be translated one-to-one to health and long-term care insurance.

When it comes to pension insurance wealth, the legitimate question arises whether the wealth measure should take into account benefit entitlements on an *"accrued-to-date"* basis or on a *"going-concern"* basis. The former means that only entitlements acquired up until the date of valuation are included; the latter means that also entitlements likely to be gained in the future are included, net of future pension contributions paid in return.[8]

Most papers of the related literature, including the recent pension insurance wealth study of Knell and Koman (2022) for Austria, use the first method. In terms of assumptions, which inevitably introduce a certain degree of uncertainty, this method has the advantage of requiring fewer assumptions about the remaining working career. Plus, the accrued-to-date approach makes a lot

[7] Pension providers pay a certain additional contribution to the respective health insurance provider on behalf of their pension recipients. Federal, state and local governments, which are also pension providers for the civil servants they employ and for federal railway employees with civil servant status, continue to pay the abovementioned "employer contribution" rate after retirement (3.535% and 4.3%, respectively).The social insurance pension providers pay a certain percentage of the pensioner's own contribution, a sort of equivalent to the "employer contribution": 71%, 208%, 78%, 287% and 92%, respectively, on behalf of federal, state and local government employees without civil servant status, private-sector employees without civil servants status who (see above) fall under the coverage of the "BVAEB", the remaining (great majority of) private sector employees (which are under the coverage of the "ÖGK"), farmers, and self-employed people in trade and industry. (The latter percentage has been increased from 92% to 96% in the meantime.)

Contrary to the "employer contribution" for active employees, however, we will not treat these contributions as insurance contributions of the insured in our calculations, but as government transfers to health insurance.

[8] The going-concern amount is equivalent to the cost-covering compensation that would need to be paid to a new insurance provider should the insured person switch, while keeping contribution and benefit rules unchanged.

of sense when it comes to pension insurance wealth, given that an accrued-to-date pension entitlement actually exits: It is the pension benefit which the insured person would receive according to the pension formula if he would quit working and contributing at the date of valuation and would not resume working and contributing until the date of retirement.

But using the accrued-to-date approach does not make any sense in the case of health insurance wealth. After all, pension insurance rests on the principle that people pay contributions and accumulate pension accruals – financed either by their own contributions or by the support of the social safety net – prior to retirement and receive benefits afterward, based on the sum of accruals collected up to then. Once they stop contributing and collecting pension accruals, the entitlement due afterward freezes at the accrued-to-date level. By contrast, health insurance rests on the principle that people pay contributions on their own or are supported by the social safety net *now* to be eligible for services *now,* and if they stopped contributing and fell out of the social safety net now, they simply would lose health insurance coverage. Their entitlement is not frozen at an accrued-to-date level; their insurance and entitlement simply expire and there is no meaningful accrued-to-date level. What you can expect to receive from health insurance is not determined by past decisions, but by current ones (made either by you or the insurance system).

Hence, we are applying the going-concern approach to our health and long-term care insurance wealth measure. In other words, we accumulate health and long-term care insurance benefits for the individual's entire remaining lifetime, net of insurance contributions paid for the entire remaining lifetime.[9]

"Gross insurance wealth" only accounts for the benefits received, *"net insurance wealth"* also accounts for the contribution side, which means that it does also take account of the insurance contributions paid, in return, to the social insurance scheme for the remainder of a person's lifetime. It is our true wealth measure.

Calculating these present values requires data: (1) on health and long-term care benefits received over the life cycle and across gender, (2) on health insurance contributions paid in return, also age and gender specific, and (3) age- and gender-specific mortality rates.

We calculate health and long-term care insurance wealth figures at both the macro- and the micro-data level. The former are calculated for the average contributor to the employees' social insurance scheme. The latter are calculated by applying our insurance wealth formula to the data base provided by the Household Finance and Consumption Survey.

The *System of Health Accounts* is our crucial data base on the benefit side; it provides age- and gender-specific data on received health and long-term care benefits. Section 4.2 below gives a description.

Contribution bases – active incomes and pension benefits – are provided by age- and gender-specific social insurance and tax statistics data at the macro level and by the Household Finance and Consumption Survey at the micro level, where expected pension benefits can be derived from Knell and Koman (2022). Contribution data will be addressed in detail in section 4.3.

[9] The going-concern amount is also – in the sense in which these concepts are defined by Holzmann and Koettl (2014) – equivalent to the (accumulated) "savings component" of the insurance scheme, if the life-long contributions paid by the insured person do exactly cover the services and benefits received by him, which means that there is no "redistributive component".

At the macro level, we also need age- and gender-specific numbers of insured individuals to calculate averages across age groups and genders; these are drawn from Austrian social insurance and labor market statistics.

At this still "pioneering" stage of research in the field of augmented wealth, we use the 2017 period mortality and survival rates, which leaves room for future improvement and sensitivity analyses: For instance, cohort-specific as well as income-dependent mortality and survival rates will definitely provide additional, enhanced and more nuanced insights.[10]

However, a proper and consistent handling of this task would, and should, open up a more far-reaching refinement of our estimation; it should involve, sort of alongside, further specifying not only our mortality and life expectancy data but also our *benefit data* to be cohort-specific and income-dependent.

The consequences of cohort-specific and income-dependent mortality and survival rates, on their own, are quite straightforward: A secular rise in life expectancy must necessarily lead to increased insurance wealth levels across the board, and income-dependent mortality and survival rates are, as such and broadly speaking, supposed to increase insurance wealth levels for high-income individuals while reducing them for those with lower incomes, because life expectancy is supposed to increase with income.

Medical progress, however, will not only reduce mortality and increase life expectancy for younger cohorts; it will also shape, as compared to the older cohorts, their particular overall health and medical history and, consequently, the amount of health and long-term care services needed over their extra years of life gained from increased life expectancy and throughout their entire lifetime. And income and standard of living do not only tend to affect mortality and life expectancy, they also tend to affect people's overall health and medical history already prior to death and, hence, their expected need for health and long-term care services. We will come back to these issues in the next subsection, which will focus on our benefit data.

Finally, we need an assumption about real wage and productivity growth with which we annually index benefits and contribution bases, and the present value formula requires a reasonable assumption concerning the interest and discount rate. For the sake of comparability, we rely on the assumptions already made in the related study on pension insurance wealth by Knell and Koman (2022): The rate of productivity growth is set to 1.3% (in line with the assumptions made in European Commission, 2021), the base case real discount rate to 3% and alternative rates of 1.3% and 5% are used for sensitivity analysis, the lower bound, thus, being set equal to the productivity growth rate, which provides an easily interpretable present value border case.

4.2 The System of Health Accounts

As mentioned above, the "System of Health Accounts" is the main data source on the benefit side, i.e. when and as long as it comes to calculating gross insurance wealth. It is a "satellite account" to the System of National Accounts and provides detailed and multiply classified data on health expenditure (for an in-depth introduction, see OECD, 2000; OECD, Eurostat and World Health Organization, 2017; Statistics Austria, 2020).

[10] For an elaboration on period vs. cohort vs. income-dependent survival rates in the context of pension policy analyses, see e.g. Ayuso et al. (2021), Holzmann et al. (2020), and Ayuso et al. (2017).

4.2.1 The classification of health expenditure into health care and long-term care, and by financing scheme

The System of Health Accounts provides above all a classification of health expenditures according to the three axes *consumption, provision, and financing* of health and long-term care services. The key health accounting dimensions are the health care function (abbreviated as "HC"), the health care provider ("HP") and the health care financing scheme ("HF"). These aggregate data are published annually with a two-year time lag (as in Statistics Austria (2018) for our base year 2016). No investment expenditures are taken into account here, but only current expenditures that directly benefit consumers – which is precisely what we need.

The *functional classification in the health accounting framework* reflects the whole range of different benefit packages provided by the health and long-term care system. It may be broken down to a three-digit level; for our purpose, the two-digit level will suffice, however:

HC.1.1 Inpatient curative care
HC.1.2 Day curative care
HC.1.3 Outpatient curative care
HC.1.4 Home-based curative care

HC.2.1 Inpatient rehabilitative care
HC.2.2 Day rehabilitative care
HC.2.3 Outpatient rehabilitative care
HC.2.4 Home-based rehabilitative care

HC.3.1 Inpatient long-term care
HC.3.2 Day long-term care
HC.3.3 Outpatient long-term care
HC.3.4 Home-based long-term care

HC.4 Ancillary services
HC.5.1 Medical goods: Pharmaceuticals and other medical non-durable goods
HC.5.2 Medical goods: Therapeutic appliances and other medical goods
HC.6 Preventive care
HC.7 Governance, and health system and financing administration
HC.9 Other health care services not elsewhere classified

What is crucial here for our purposes is the distinction between health care in the stricter sense, namely excluding long-term care, and long-term care (HC.3). This allows to calculate separate values for health insurance wealth in the stricter sense and long-term care insurance wealth.

Health care providers are organizations and actors that deliver health care goods and services as their primary activity (as well as those for which health care provision is only one among several activities). This particular classification is of lesser interest for us and our purposes, however, and we just mention it here for the sake of completeness; it involves, at the first-digit level:

HP.1 Hospitals
HP.2 Residential long-term care facilities
HP.3 Providers of ambulatory health care
HP.4 Providers of ancillary services
HP.5 Retailers and other providers of medical goods
HP.6 Providers of preventive care

HP.7 Providers of health care system administration and financing
HP.8 Rest of economy
HP.9 Rest of the world

The aim of the accounting framework for *health financing* is to provide a picture of the flow of funds. It addresses the issue how health care services or goods are financed, for example, what share of spending is covered by government spending and compulsory insurance, by voluntary insurance and by self-payments of patients out of their own pockets. This is also crucial for our purposes, as it enables us to distinguish between compulsory (or public) and voluntary (or private) insurance wealth as well as self payments which are not covered by any insurance at all. This classification goes also down to the three-digit level; for our purpose, we can settle with the two-digit level:

HF.1.1 Government schemes
HF.1.2 Compulsory contributory health insurance schemes
HF.2.1 Voluntary health insurance schemes
HF.2.2 Non-profit institutions financing schemes
HF.2.3 Enterprise financing schemes
HF.3 Household out-of-pocket payment
HF.4 Rest of the world financing schemes

And what's more, Statistics Austria also provides a variety of two-dimensional (or even three-dimensional) cross-classifications. For our purposes, the cross-classification by health care services and goods (HC) and financing systems (HF) is of vital interest. It enables us to compute health insurance wealth in the stricter sense and long-term care insurance wealth, and, furthermore, both as long as they accrue through public-sector or private-sector schemes – and all these values also properly corrected for self-payments for benefits and services which are not covered by any insurance and which the patient has to pay out of his own pocket.

Table A1 in the appendix presents the cross-classification of expenditure on health care in Austria by functions and financing schemes in year 2016, basically as originally provided by Statistics Austria (Table "HCxHF"). Total expenditure on health care (HC.1–9 and HF.1–4) amounted to EUR 36,876 million.

Just to clarify a number of technical remarks in advance: For our purposes, i.e. when it comes to the calculation of insurance wealth figures, we will not take into account governance and administration cost (HC.7 = EUR 1,547 million), because they simply do not lead to a personal benefit of the insured, but we do take into account expenditure on preventive care (HC.6 = EUR 795 million), because they actually do lead to a personal benefit, although they are not classified, for whatever reason, into expenditure on "personal health care services and goods" (HC.1–5 = EUR 34,533 million). HC.8 does not exist and HC.9 and HF.4 are residuals of zero value; therefore we will refer to HC.1–6 and HF.1–3 as "health and long-term care expenditure" from now on, EUR 35,328 (= 36,876–1,547 = 34,533+795) million in 2016.

Furthermore, we make some consolidation steps right from the start in order to arrive at a manageable number of meaningful categories: "Enterprise financing schemes" (HF.2.3) – basically occupational medical care which can be treated as wage component – are included into "Voluntary health insurance schemes" (HF.2.1) and "Non-profit institutions financing schemes" (HF.2.2) – which are, at the end of the day and at least to a significant extent, dependent on government subsidization – into "Government schemes" (HF.1.1). So we end up with four (types of) financing

schemes, government schemes (HF.1.1+HF.2.2), social insurance schemes (HF.1.2), voluntary insurance schemes (HF.2.1+HF.2.3), and self-payments (HF.3).

When we calculate health insurance wealth figures, government schemes and government spending will be allocated, for logical reasons, to the social health insurance sector, and the two together form what we will call the "compulsory insurance scheme", in which the insured acquire and build up "compulsory insurance wealth".

Finally, our database, the System of Health Accounts, does also have certain limitations which we had to put up with at this very stage of our work and where we certainly do have some room for further improvement: It does not take into account certain income replacement benefits which are provided by social health insurance, most prominently sickness benefits, maternity benefits, and rehabilitation benefits (EUR 704 million, EUR 503 million, and EUR 314 million, respectively, in 2016, see Federation of Austrian Social Insurances (2017a), Table 5.09).

Table 1 provides a summary to table A1. Of the overall sum of EUR 35,328 million spent on health and long-term care expenditures, EUR 29,926 million, i.e. 84.7%, are spent on health care benefits in the stricter sense and the remaining EUR 5,402 million or 15.3% go into long-term care.

Table 1: Health and long-term care insurance benefits in 2016 (in EUR million and %, respectively)

	Health care		Long-term care		Health and long-term care	
Total expenditure	29,926	84.7	5,402	15.3	35,328	100.0
Government schemes	7,452	24.9	4,091	75.7	11,543	32.7
Social insurance schemes	15,522	51.9	11	0.2	15,533	44.0
Voluntary insurance schemes	1,276	4.3	0	0.0	1,276	3.6
Self-payments	5,676	19.0	1,301	24.1	6,977	19.7
Total expenditure	29,926	100.0	5,402	100.0	35,328	100.0

Source: Statistics Austria, authors' calculations.

And as already said in advance above, health and long-term care in Austria are financed predominantly through a mix of income-related social health insurance contributions and general taxes; these two sources of finance together cover more than three quarters of health and long-term care expenditure. While, however, the funding of health care in the stricter sense is mainly based on social insurance (51.9%), long-term care benefits are largely financed out of the government budget (75.7%); there actually even is, as already mentioned, no such thing as a special social long-term care insurance contribution in Austria. Self-payments finance about 19.7% of total health and long-term care expenditure, private, voluntary health insurance about 3.6%. Contrary to health care, however, private health insurance is non-existent in long-term care, and self-payments play a bigger role there, covering almost one-quarter of total long-term care expenditure (24.1%).

4.2.2 The classification of health expenditure according to age and gender

The System of Health Accounts does also provide classification of health and long-term care expenditure according to several additional dimensions. Of particular interest for our purposes is the classification according to age and gender of beneficiaries, because these are basically the data we need for the calculation of (gross) insurance wealth as we have defined it above: the present

value of health and long-term care benefits an individual or a household of individuals will receive over its remaining lifetime, individuals specified, at least, by age and gender.

This classification of health and long-term care expenditure according to age and gender is not produced on an annual basis, however, but only once every few years; the one provided for the year 2014 is the closest one to our base year 2016.

The age groups according to this age classification are infants up to one year, toddlers from one to four years, persons from five to ninety-four years in five-year increments, and the group ninety-five years and older, and the age-gender classification is provided for the health care benefit categories at the two-digit level of the functional classification ("HC", see above in section 4.2.1). There is no age-gender distribution provided for preventive care, however.

To derive an age-gender distribution for 2016, we allocate health expenditure at the two-digit level across age groups and genders based on the per-capita values from 2014. In other words, the per-capita values for different age-gender groups at the two-digit level are assumed to remain constant in proportion to each other, which seems to us to be the most plausible and least ad hoc approach. The age-gender distribution of preventive care expenditures is set equal to the distribution of the sum over all other expenditure categories. Table A2 in the appendix presents the results.

Finally, in the absence of better alternatives, we apply these age-gender profiles at the two-digit level uniformly across all three financing schemes, i.e. compulsory insurance (including, as mentioned above, government spending), voluntary insurance and self-payments. This is of course a somewhat crude assumption, but our health accounts database, unfortunately, does not have more to offer so far.

The resulting per-capita values for year 2016, adjusted to year 2017 prices with a 2% annual inflation rate, finally serve as the age- and gender-specific input flow data in the calculation of gross health and long-term care insurance wealth figures in the sections below.

Our age- and gender-specific per-capita values for health and long-term care benefits are, of course, only age- and gender-specific *averages*; behind these average values, there are widely dispersed individual values. And the dispersion is not uniform across schemes; it is, most likely, greater in the field of long-term care. The proverbial annual or semi-annual dental check-up is something we all have to deal with, inevitably. However, long-term care services towards the end of life are, to some extent, something we would all prefer to avoid and that only affect a certain percentage of our fellow citizens.

One simply has to start somewhere, but we do not want to make a secret of it that relying on data specified only by age and gender can only be a first step into this new field.

For instance – arguably a first step of refinement – we do not yet differentiate benefits according to birth cohorts or income levels here; we leave that to a future version which will also incorporate cohort-specific as well as income-dependent mortality and survival rates. As already pointed out in the previous subsection, trends and socioeconomic patterns in mortality and morbidity are strongly interlinked and should therefore be addressed together.

As far as secular and cohort trends of morbidity are concerned, a wide range of hypotheses are under discussion, which might offer a broad field for scenario and sensitivity analyses. Until the early 1980s, the prevailing paradigm suggested a rather pessimistic scenario, sort of an *"expansion of morbidity":* It was also termed *"the failure of success"* theory (Gruenberg, 1977), a wording which tries to capture the irony that, despite the success in increasing longevity, there is actually

also a simultaneous "failure" involved, because, unfortunately, what is increasing is primarily the time spent in ill health: The delay of the onset of terminal morbidity toward the end of life is less pronounced than that of mortality and the end of life itself. To put it simply: We gain additional lifetime, but only to spend it in poor health, unfortunately. A rather radical "shift in paradigm" was promoted by Fries (1980), who explicitly envisioned the polar opposite, a *"compression of morbidity"*, which was also called the *"healthy ageing hypothesis"*. According to his vision, the onset of terminal morbidity would be delayed to a *greater* extent than the end of life. To put it simply: We gain additional lifetime, and, what is more, we spend less time in poor health. And these two diverging morbidity scenarios would also affect health expenditure trends quite differently. A position somewhere in between is taken by the "dynamic equilibrium hypothesis" going back to Manton (1982): While the period of terminal morbidity might be extended, just as in the "expansion of morbidity" scenario, this could be counterbalanced by a decrease in the *severity* of illness. To put it simply: We gain additional lifetime, and while it is not spent in ideal health, it is also not spent in all-too-poor health. And another new view on the issue emerged stating that emphasizing population ageing as the primary cause of increasing morbidity and per-capita health expenditure is, altogether, running the risk of creating a sort of "red herring". The crucial driving factor according to this view is not the time *since birth*, but rather the time or proximity *to death* (Fuchs, 1984; Zweifel, 1999). In their final conclusions, the "red herring" and "compression of morbidity" hypotheses seem to be very much in line – an increasing life expectancy would be accompanied by a shift of the terminal health cost increase along the time axis to later years of age. The empirical evidence contributed to this debate is not entirely clear yet, however, and a cautious insurance wealth estimation should therefore account for a range of scenarios.

In Austria (see Klimont, 2020), life expectancy at birth has increased between 1978 and 2019 by 10.8 years – from 68.5 to 79.3 – for men, and by 8.3 years – from 75.7 to 84 – for women. Over the same time period, *healthy life expectancy* increased by 10.7 years for men (from 52.4 to 63.1 years) and by 11.8 years for women (from 52.9 to 64.7 years). The share of healthy years thus increased from 76.5% to 79.5% for men and from 69.9% to 77% for women, which indicates at least *relative* compression of morbidity in the case of men and clear absolute compression in the case of women.

If a compression of morbidity does indeed take effect, it could at least partially, and in an extreme case even completely, offset the upward health cost pressure arising from a secular increase in life expectancy. We, hence, have two issues of medical progress here which are strongly interlinked and would have to be addressed simultaneously.

As far as further socioeconomic patterns of health and long-term care service consumption are concerned – and of course the most prominent additional socioeconomic variable would be very likely income, we again have to deal with a certain variety of relevant factors and with a complex interplay of factors and effects. Simply put, a person's demand for health and long-term care services theoretically depends on his financial resources (the variable which affects his budget constraint), his preferences for health and long-term care services, and finally his health status and risk of illness as an objective constraint on individual choice.

In a social health insurance system, income and wealth as financial constraints should ideally play no role as factors of demand. However, they may still have a certain influence, because access to and affordability of health care can still be somewhat limited even in well-developed health systems. And, again, even in well-developed social health insurance systems: Although their preferences should be guided and shaped by the advice of competent and caring healthcare pro-

fessionals, low-income people may also, due to a certain disadvantage in health literacy, end up with a somewhat less-developed knowledge about and preference for health and long-term care services. This would point to a "positive income effect", meaning that demand for health and long-term care services is *increasing* with income.

Apart from that, however, there are good reasons to believe that low-income groups tend to be at higher risk of illness due to higher occupational risks and, in addition, lifestyle risks stemming from a certain disadvantage in health literacy. This would point to a "negative income effect", meaning that demand for health and long-term care services is *decreasing* with income.

And moreover, (even a little) less access to and affordability of health care and (even a little) less determined use of health care services may accumulate and ultimately bounce back over time. Ultimately, this would result in a deteriorated health status and increased risk of illness: So, at least as age is progressing, of the two effects described above, the negative one would get bigger and bigger and ultimately tend to dominate the positive one. This would, to finally sum up, point to an "overall negative income effect", meaning that demand for health and long-term care services is *decreasing* with income.

Widespread empirical evidence indeed shows that low-income groups tend to be at significantly higher risk than high-income groups. For example, based on calculations for the USA using Medical Expenditure Panel Survey (MEPS) data, Kaestner and Lubotsky (2016) show that 25% of those in the bottom quintile of the family income distribution reported being in only poor or fair health in 2012, while only 7% of those in the top quintile did so. (Respondents were asked to rate their health as being excellent, very good, good, fair, or poor.) This pattern of poorer health among those with low incomes extends to many other measures of health, including mortality (see Cutler et al., 2006).

For Austria, 2019 data from the Austrian Health Interview Survey (ATHIS) show a significant positive correlation between income and good or very good subjective health (see Hofmarcher and Singhuber, 2021). (Similar results had already been reported by Biffl, 2003): Overall, 11,446 (about 74%) of the 15,461 respondents reported being in good or very good health. As one would expect, younger respondents were more likely to rate their health as good or very good than older respondents. However, at the same time, the proportion of people in good or very good subjective health increases with income for each age group: Among respondents with an equivalized income below 60% of the median, only 65% considered themselves to be in good or very good health, while among those with an income above 150% of the median, 87% did so. And this effect also increases with age: In the age group 65 years and older, only 39% of the respondents below 60% of the median considered themselves to be in good or very good health, compared to 71% among those above 150%.

If demand for health and long-term care services does indeed decrease with income, this could at least partially, and in an extreme case even completely, offset the effect of a higher mortality and a lower life expectancy of low-income groups. We, hence, have again two medical issues here which are strongly interlinked and would have to be addressed simultaneously.

To go further: In a very general sense – and quite independently of socio-economic factors such as income – medical progress has already led and will increasingly lead to greater variation in per capita expenditures across insured individuals, as an increasing number of new and innovative therapies and medications, typically highly research-intensive and costly, enter clinical practice. Evidence from the German and Swiss health insurance systems – see e.g. Wende and Schmitt (2021) and Sommer and Biersack (2005) – shows that only a small number of high-cost patients,

who are undergoing extremely expensive therapies, account for a disproportionately large share of health care spending. A major and, in this context, particularly noteworthy driving force of medical progress (and a sort of source of medical hope) has come to be labeled *"personalized medicine"*: Many inexpensive drugs are cost-effective on average, but ineffective for a minority of patients for whom only more expensive drugs will work – high-cost drugs which are increasingly personalized and sort of "tailor-made" for small sub-groups of the population (such as individualized cancer treatments).

4.3 Contributions for health and long-term care insurance

The health and long-term care benefit data described in section 4.2 allow us to compute gross health and long-term care insurance wealth figures. Properly taking account of health and long-term care services consumed over the remaining life cycle is just one aspect, however, just one side of the coin, when it comes to calculating true wealth figures, in the sense of net wealth, which does also have to take account of the insurance contributions which you have to pay in return for the services you receive.

We will do that at both individual and household levels, and at the "macro level" in a way, for the average contributor to the Austrian social health insurance scheme for employees, and at the household level also for the households included in the micro-data sample of the Austrian Household Finance and Consumption Survey.

The following two subsections summarize the methodological solutions and compromises which we had to adopt on this path.

4.3.1 Calculations for the Austrian social insurance schemes for employees

In our first group of calculations, we compute health and long-term care insurance wealth levels for the average contributor to the Austrian social health insurance scheme for employees.

We include active employees without civil servant status, unemployed employees and recipients of disability and old-age pensions from the employees' social insurance scheme, fully categorized across age and gender according to Austrian social insurance and labor market statistics, but no survivor benefits, however. Here we certainly have some room for improvement. The problem which would have to be addressed and solved is that recipients of survivor benefits could either be active employees, unemployed employees and recipients of own pensions themselves or not, and that they would need to be properly categorized among these groups if they are, which would need information leading beyond our current data set. If they are also employees or own pension recipients, including their survivor benefits would increase their contributions and decrease their net insurance wealth. If they are not, they are actually new to the sample and would decrease average contributions and increase average net insurance wealth, because survivor benefits are typically lower than wages or own pensions.

We have employees in the age range 14 to 78 and recipients of old-age or disability pensions from age 16 onward. When we also present age-gender specific data on benefits, contributions, and insurance wealth for age cohorts below 14, these should be viewed as "prospective employees", who actually do not work yet und who also do not yet make compulsory contributions.

Age and gender specific wages and social insurance contribution bases of employees and age and gender distribution of the unemployed are readily available in Austrian social insurance and labor

market statistics, which enables us to calculate effective social contribution bases according to age and gender.

We make the simplifying assumption that employees retire uniformly at age 65 or, if they are already 65 or older than 65, immediately on January 1, 2017: Women, however, born until June 1, 1968, are actually entitled to retire already before 65; until birth date December 1, 1963, they can retire at age 60, and for birth dates afterward, every six months the retirement age increases by six months, until it reaches indeed 65 for women born on June 2, 1968, and afterward.

And these new pension benefits we set equal to the average new old-age pension reported by the Federation of Austrian Social Insurances for the year 2016: EUR 2,211 per month in the case of male employees and EUR 1,212 in the case of female employees (valorized as described below).

Age and gender profiles of the already existing stock of old-age and disability pension benefits of the year 2016 are assembled together from two different sources: Austrian social insurances statistics report pension recipients fully categorized by different social insurance branches (employees without civil servant status, farmers and self-employed in trade and industry), by pension type (old-age, disability and survivor) and by age and gender (Federation of Austrian Social Insurances (2017a), tables 3.11–3.14), but pension expenditure only by different social insurance branches, by pension type and by gender (tables 3.16–3.19), and not by age, unfortunately. We therefore had to augment this data base with data from the wage tax statistics (Statistics Austria (2017), table 6.9), which reports pension recipients and pension expenditure by age and gender, but, on the other hand, not by different pension insurance branches and also not by pension type (employees without civil servant status, employees with civil servant status, farmers and self-employed in trade and industry and old-age, disability and survivor benefits are all lumped together). We basically took the age profiles from the wage statistics – although not 100% suitable – and integrated them into the social insurance data.

Finally, and for the sake of simplicity, we also disregard survivor benefits which will be newly derived from wages and pension benefits in the further future (in line with Knell and Koman (2022) here), just as we did not take into account the existing stock of survivor benefits of the year 2016.

Wages and pension benefits of the year 2016 are again, just as health and long-term care benefits, adjusted to 2017 prices with a 2% annual inflation rate. From 2017 onward, wages and newly granted pensions are assumed to grow according to a 1.3% annual real (productivity) growth rate. We also let, on the other hand, per-capita benefits grow in real terms synchronously by 1.3%, based basically on two plausible assumptions, that health care and long-term care services are, at least, not inferior goods and that they are also at least to some extent subject to Baumol's cost disease.

A uniform wage and pension growth assumption must definitely be seen as a first-step and ”base case” approach; further research could and should consider and include also at least a moderate between-gender wage and pension convergence assumption.

Compulsory health insurance contribution rates have already been addressed in detail above (section 3). We assume the standard case of a private-sector employee subject to a 7.65% contribution before retirement and a 5.1% contribution afterward. We have to put up with and work with a minor simplification and are not one 100% representative here: Public sector employees without civil servant status are insured in the civil servants’ health insurance scheme and pay a slightly lower 7.635% health insurance contribution rate as long as they are active.

We also take properly into account the tax effect of compulsory health insurance contributions: Social insurance contributions are tax-exempt and reduce the income tax assessment base and, thus,

the payable tax. This tax benefit has to be subtracted from the nominal 7.65% and 5.1% contribution.

Our net insurance wealth figures presented here do only take into account social insurance contributions as a source of finance. Here we have indeed major room for improvement: As already described above in sections 3 and 4.2.1, social insurance health and long-term care benefits are, however, not completely financed by social insurance expenditure and finally (for the most part) social insurance contributions; already almost one quarter of health care benefits, and even three quarters of long-term care benefits are funded out of the general government budget and finally from general tax revenue – there even is no such thing as a long-term care insurance contribution in Austria. Our net insurance wealth figures are, hence, for the time being finally still not complete and in a certain sense to some extent biased upwards. A tax formula will finally have to complement our contribution formula. We plan to provide a single tax correction for a total augmented wealth estimate, including, particularly, pensions, health and social housing. Such a correction is expected to reduce the insurance wealth estimate as well as the inequality estimate, as the overall tax schedule across direct and indirect taxation is progressive. In other words, for the time being our amount of insurance wealth will be somewhat overestimated and the overall redistributive effects underestimated.

A special problem are voluntary health insurance contributions. So far, we have not been able to find reliable contribution data by age and gender. So we decided to put up with, for the time being, a self-constructed profile, as simple and unpretentious as possible. Gender-differentiated contribution rates are actually already encountering legal boundaries anyway, and so we only had to take one step further to come to the assumption of a per-capita flat, also age-independent, contribution rate. This per-capita flat rate was calibrated in such a way that the lowest of our voluntary health insurance wealth values, the amount arising for a one-year-old male at a 5% discount rate, meets the zero constraint (see section 5.1).

4.3.2 Calculations for the Austrian Household Finance and Consumption Survey

We will finally also present health and long-term care insurance wealth figures for the households included in the micro-data sample of the Austrian Household Finance and Consumption Survey, based on data from the survey's third wave of data collection between late November 2016 and July 2017 (for an introduction see Fessler et al., 2018).

The Austrian Household Finance and Consumption Survey (HFCS) is a comprehensive survey of household balance sheets conducted by the Economic Microdata Lab of the OeNB's Research Department and it gives regularly account of incomes and expenditures as well as real assets, financial assets and debts of a representative sample of Austrian households, thus providing a valuable data set suitable for in-depth wealth analysis. In the course of the third wave, 3,072 households were interviewed with 6,414 household members, of whom 5,476 were at least 16 years old.

The HFCS sample has already served as the platform for the pension insurance wealth study of Knell and Koman (2022). Lindner and Schürz (2021) have provided, as an input and actual starting point for it, a statistical matching with a complete end-of-2016 snapshot of the Austrian pension account register, which included "pension credits" built up until end-December 2016 of all active individuals born between 1955 and 2001, and based on this matching exercise and original HFCS data on already payable pension benefits, pension insurance wealth figures could be calculated (according to the accrued-to-date approach).

We try to stay as much as possible in line with the methodology already applied in the calculation of the "macro indicators" described above and with the pension insurance wealth calculations presented in Knell and Koman (2022). Some additional peculiarities come up and deserve to be mentioned, however.

First of all, we focus our HFCS evaluation on two insurance wealth (core) concepts; on net compulsory health insurance wealth and (net compulsory[11]) long-term care insurance wealth (both evaluated alongside with net wealth in the "conventional" sense).

The age- and gender-specific benefit data are basically the same as those used for the "macro indicators" (see section 4.2), and data on personal incomes and social insurance contribution bases are either original data from the survey, data derived from the pension account matching provided for Lindner and Schürz (2021) for Knell and Koman (2022), or combined together from these both sources: Already payable pension benefits of the already retired can be taken directly from the survey data, pension benefits of those who are assumed to retire immediately at our date of valuation, January 1, 2017, are derived from the pension credit which has been matched to them, active incomes of still active contributors can again be taken from the survey and their expected pension is combined together, according to the Austrian pension account formula, from this income and the end-2016 pension credit which has been matched to them.

We assume that active contributors retire uniformly at the statutory age or, if they are already older than that, immediately on January 1, 2017. In line with Knell and Koman (2022) and a little more accurate than in the calculation of the macro indicators (see above), we let women's retirement age here follow exactly the path which is laid down in the law: Women born until June 1, 1968 are entitled to retire already before 65, the legal retirement age for men; until birth date December 1, 1963, they can retire at age 60, and for birth dates afterward, every six months the retirement age increases by six months, until it reaches 65 for women born on June 2, 1968, and afterward.

We do not take account of contributions paid from survivor benefits which will be newly derived from wages and pension benefits in the further future, in line with Knell and Koman (2022) and our approach chosen in the calculation of macro indicators.

Our information on active incomes is only based on the snapshot given for the survey time. There is no information available on how these incomes will evolve afterward, however. We did again assume a general 1.3% productivity and real wage growth rate, but this certainly does not capture individual career steps und necessarily underestimates future contributions – and overestimates net insurance wealth – of younger contributors and particularly of those who were, at the time when the snapshot was taken, simply too young to contribute at all. Here we have again room for improvement.

Compulsory health insurance contribution rates are assigned to contributors as accurately as possible, but we again have to make compromises and it is not possible to identify in complete detail the contribution regime for each and every individual in the sample, because the survey, even augmented with the output of the above-described pension account matching, simply does not provide the relevant information in complete detail: We do have information on whether a contributor is an employee without civil servant status, a civil servant, a farmer, a self-employed in trade and

[11] Just as a reminder, there is no such thing as a *voluntary* long-term care insurance and *gross* and *net* compulsory long-term care insurance wealth necessarily coincide as long as we do not take into account general government financing, because there is no such thing as a special long-term care social insurance contribution.

industry or a recipient of a social insurance pension or a civil service pension. But we do not have information on whether an employee without civil servant status is subject to the special scheme for public-sector employees, where he would pay, as long as he is active, a slightly lower contribution rate of 7.635% instead of the standard employee rate of 7.65%. And we also do not have information on whether a civil servant is a federal railways employee and subject to, as long as he is active, a special 9.05% rate instead of the 7.635% rate in the standard civil service regime.

Finally, we mention for the sake of completeness again that we do not yet take into account tax financing of health and long-term care insurance. Thus, our net insurance wealth figures are, for the time being, to some extend biased upwards.

5. Results

The following three subsections present the results of our calculations: health and long-term care insurance wealth estimates at the macro-data level for the average contributor to the employees' social insurance scheme and for stylized household constellations and estimates at the micro-data level for the household composition from the Austrian Household Finance and Consumption Survey 2017.

5.1 Results for the average contributor to the employees' social insurance scheme

The main building blocks of our macro-level calculations are, first, the annual flows of health and long-term care insurance benefits and contributions of the average contributor (subsections 5.1.1 und 5.1.2), second, the rest-of-life present values and wealth figures at the individual level for which these flow data serve as the major input (subsections 5.1.3 und 5.1.4), and finally, a first macro-data-based evaluation of insurance wealth figures at the household level (next section 5.2).

5.1.1 Gross health and long-term care insurance benefits

Flows of health and long-term care insurance benefits and contributions of the average contributor, classified by age and gender, by insurance and financing scheme, and by active-versus-retired status, everything for our base year 2017, have been derived from the data sources and calculated according to the methodology presented above in sections 4.2 and 4.3.1.

We start by consolidating the available classification and distinguish between four insurance and financing schemes: compulsory health insurance in the stricter sense (excluding long-term care), long-term care, voluntary health insurance and self-payments (either for health care services in the stricter sense or long-term care services).

Figures 1 to 4[12] present gross and net benefits and contributions per capita by age, gender and insurance and financing scheme, and table 2 shows the life-cycle maximum values and the average

[12] All figures are of equal size and have the same maximum value on the y-axis, regardless of the size of the respective aggregate; this is intended to make the relative magnitudes immediately apparent and easily comparable.

values for those aged sixteen and over, again for both genders and all schemes. Tables and figures relate to the total of active and retired employees.[13]

Figure 1 presents the age-gender profile of overall gross health and long-term care expenditure per capita and Figure 2 splits them further up among our four insurance and financing schemes; these are the benefit data which will serve as the recurring backbone of all our calculations throughout this paper.

There is a very clear age profile and also some gender profile, the first seeming to be quite in line with general expectations, and the second appearing to need a bit of further and more elaborated explanation: After an initial "postnatal" peak immediately in the first year of life, EUR 4,330 in the case of male and EUR 3,853 in the case of female newborns, expenditure per capita basically rises significantly with age, and very soon the increase significantly accelerates with age; around the fifties, a clearly progressive increase emerges. Older people simply need – on average – more and increasingly more health services than younger people. To summarize and pinpoint this with two pairs of numbers: Benefits received per capita increase from EUR 1,601 after the first year of life to EUR 21,081 after the ninetieth year in the case of male and from EUR 1,344 to EUR 29,738 over the same age frame in the case of female individuals. On average, men receive EUR 4,082 after age 16 and women EUR 4,824. This leads to the gender profile. Averaged across all age cohorts, women surpass men by approximately 18%; if we use population weights (instead of employment weights), even by about 23%. A closer look reveals a certain particular age-gender pattern: Benefits received by the average woman exceed those received by the average man in two distinct age ranges: first between 15 and 59 and then later from 80 onward, and this margin is particularly pronounced, over 20% and up to even over 40%, from the 20s to the end-30s and in the 90s. At least for the first of these two special age groups, however, we do already have a well-founded and valid explanation, which leads beyond what can legitimately be called a pure "gender gap": These are basically the typical years of childbearing age and a significant portion of the benefits received by women in these years actually go towards the well-being of their unborn children.

A proper and profound analysis of these benefits should at least keep in mind that we actually already move somehow beyond the individual level and towards the family and household level here. The also very noticeable peak of female benefits at the very advanced ages will at least be able to be pinpointed, see below, as a special long-term care issue.

Figure 2 splits gross benefits up among our four insurance and financing schemes, compulsory health insurance in the stricter sense, long-term care, voluntary health insurance and self-payments.

The split-up delivers some interesting further insights: First, the acceleration of the age-driven increase in per-capita health and long-term care expenditure some years after the first half of life, and thus generally a good deal of the very steep age profile of gross benefits, can obviously be traced specifically to the dynamics of long-term care costs. And these special long-term care cost dynamics are, second, also accountable for the above-noted gender imbalance observed at very advanced ages, because the acceleration of long-term care benefits at this age range is, for whatever reason – it seems quite plausible that this is somehow connected with (or, sloppily spoken, the

[13] As "active employees" we define here those who are active on January 1, 2017. This also includes employees who are already at least 65 years of age at this point of time and therefore (see above) assumed to retire immediately (and hence assumed to receive an old-age pension and assumed to pay the pensioners' contribution rate). This is only a small group, however, 23,460 persons or 0.6% out of altogether 3,832.498 active employees. (And of course every "active employee" is properly treated as a pensioner as soon as he is 65 and assumed to retire when it comes to calculate present values of future contributions.)

"cost" of) higher female life expectancy –, particularly pronounced among women. To illustrate it with a few numbers: Only EUR 3,064 out of EUR 4,824 received by the average woman are compulsory health insurance benefits in the stricter sense, i.e. benefits isolated from voluntary insurance benefits, self-payments and, particularly, long-term care costs, and the maximum value even drops from EUR 29,738 to EUR 7,442. This is a good deal more in line with benefits received by men, which, corrected in the same way, amount to EUR 2,768 on average and to EUR 8,030 at their peak (which is indeed already even above the peak value for women). Indeed outstandingly high, however, are long-term care benefits received by women at advanced ages: The peak average amount received from age 90 onward amounts to EUR 14,270, which is two-thirds above the peak value for men of EUR 8,515, and also the average amounts, EUR 627 versus EUR 382, are similarly apart.

Age-gender profiles of voluntary insurance benefits, which are, as already described in section 4.2.1, very modest in total amount (on average EUR 158 per capita in the case of men and EUR 170 in the case of women) and self-payments, which are, as also already described above, quite substantial in total amount (on average, EUR 776 per man, EUR 964 per woman and at advanced ages maximum values of EUR 4,423 and EUR 7,570, respectively), have been derived in a somewhat simplistic manner as described in section 4.2.2. As already outlined above, self-payments come close to one-fifth of overall expenditure, which is indeed a significant magnitude and will become relevant again below, because self-payments also have to be taken into account, one-to-one, on the contribution side.

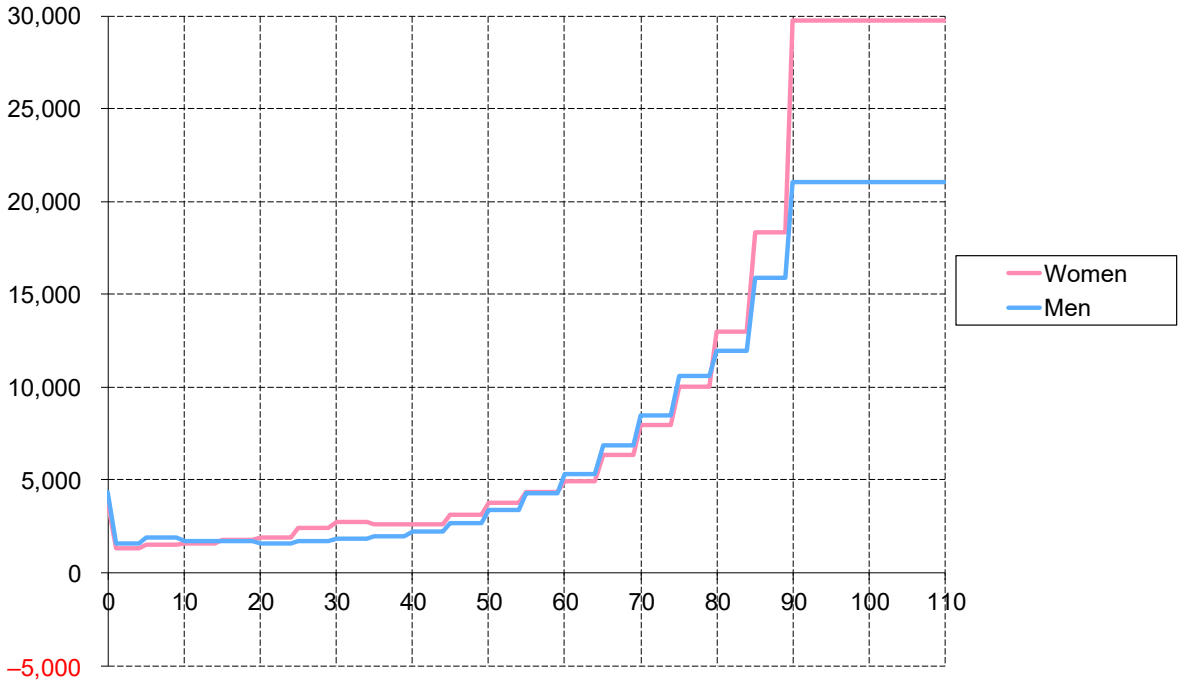


Figure 1: Gross health and long-term care insurance benefits according to age (in EUR)

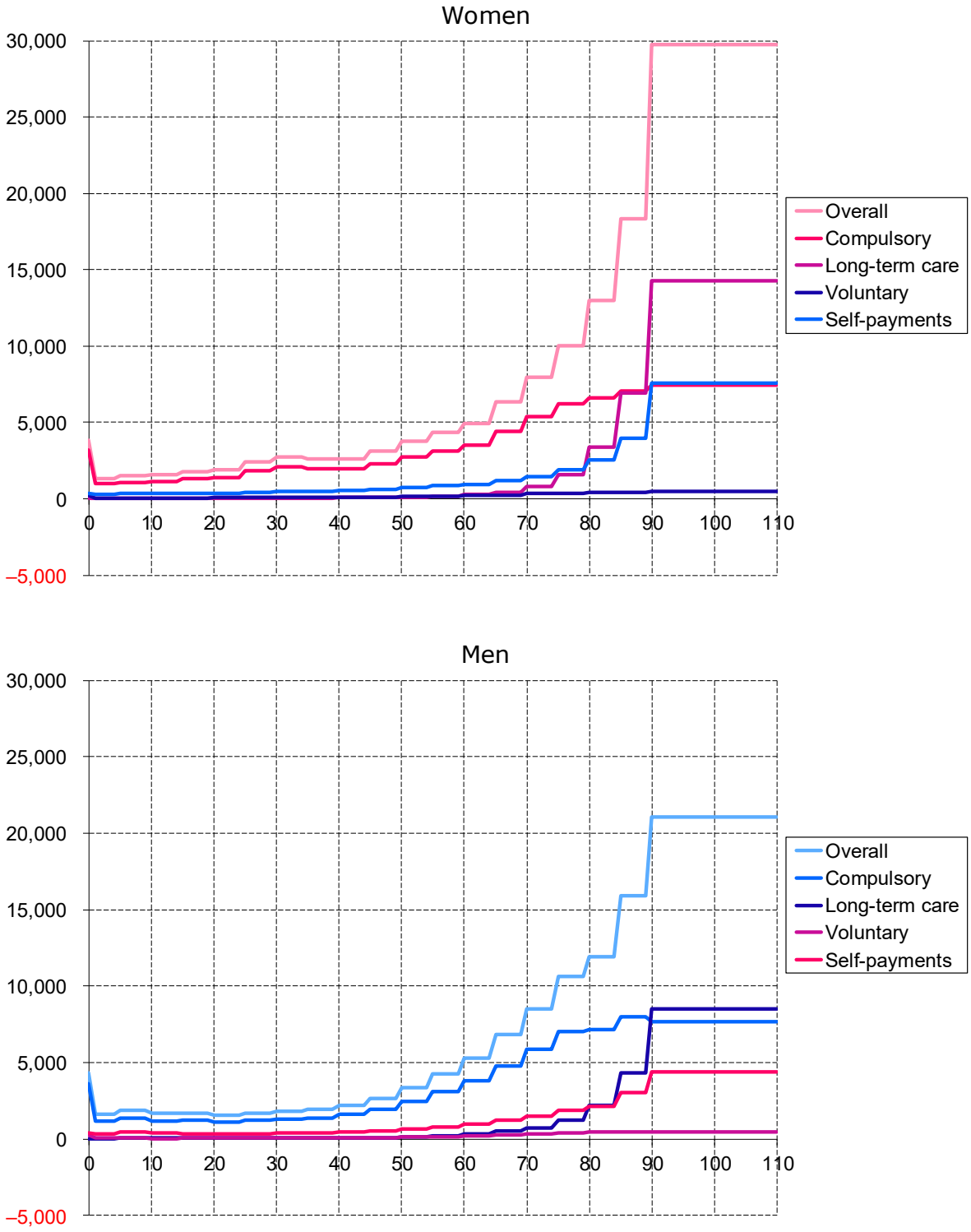


Figure 2: Gross health and long-term care insurance benefits according to age (in EUR)

Table 2: Health and long-term care insurance benefits and contributions of active and retired employees (per capita in EUR)

	M		W		M+W	
	16+	Max	16+	Max	16+	Max
Gross benefits						
Health and long-term care insurance	4,082	21,081	4,824	29,738	4,448	28,249
Compulsory health insurance	2,768	8,030	3,064	7,442	2,914	7,513
Long-term care	382	8,515	627	14,270	502	13,280
Voluntary health insurance	158	498	170	456	164	469
Self-payments	776	4,423	964	7,570	868	7,029
Contributions						
Health and long-term care insurance	2,356	5,284	2,176	8,274	2,267	7,759
Compulsory health insurance	1,476	1,924	1,108	1,481	1,295	1,672
Long-term care	0	0	0	0	0	0
Voluntary health insurance	104	104	104	104	104	104
Self-payments	776	4,423	964	7,570	868	7,029
Net benefits						
Health and long-term care insurance	1,727	15,798	2,648	21,464	2,181	20,490
Compulsory health insurance	1,292	7,274	1,956	6,843	1,619	6,860
Long-term care	382	8,515	627	14,270	502	13,280
Voluntary health insurance	53	394	66	352	60	365
Self-payments	0	0	0	0	0	0

Note: M = men, W = women, 16+ = average for those aged 16 and above, Max = maximum value.

Source: Statistics Austria, Federation of Austrian Social Insurances, Austrian Labor Market Service, authors' calculations.

5.1.2 Net health and long-term care insurance benefits

This, right on cue, finally leads from gross benefits to contributions for and net benefits from health and long-term care insurance. To start with, we again have to make reference to our four insurance and financing schemes; each one has a different story to be told, as far as contributions are concerned: As already pointed out above in section 3, there actually is no such thing as a special social contribution as far as long-term care is concerned; thus, net long-term care benefits equal gross long-term care benefits (at least as long as we disregard government budget financing of health and long-term care). And as mentioned just a few lines above, self-payments are, by definition, contributions themselves and the net benefits received through them have to be always zero, because gross benefits are equal to contributions. We have already outlined in section 4.3.1 how we deal with contributions to voluntary health insurance; we simply calibrated a per-capita flat rate, in such a way that the lowest of our voluntary health insurance wealth values, the amount arising for a one-year-old male at a 5% discount rate, meets the zero constraint. This calibrated flat rate amounts to EUR 104.[14]

[14] Just for the sake of completeness: This flat-rate contribution implies that the age profile of net benefits simply replicates the one of gross benefits, with the age-benefit curve simply being shifted downwards by the flat rate amount of EUR 104. And since the flat rate is, in present value terms, an average of the age-increasing benefit levels after the first year of life, benefits come to be, after their initial "postnatal" peak in the first year, below this contribution level until they finally break even in the 40s.

So actually no further comments are needed regarding contributions for long-term care, health and long-term care services paid out of pocket and voluntary health insurance and we can immediately focus our attention on contributions to compulsory health insurance and overall contributions to health and long-term care insurance, where we finally include also self-payments for health and long-term care services and our estimate for contributions to voluntary health insurance.

We start with contributions to and net benefits from compulsory health insurance; they are, according to age and gender, depicted in Figure 3, along with gross benefits (which are already familiar from Figure 2). The underlying methodology and data have been described in section 4.3.1.

The age-gender profile of compulsory insurance contributions is basically and broadly shaped by the increasing wage profile of the active insurance population (for obvious reasons with zero contribution before the first year of employment, age 14), the currently given gender wage disparity, and, due to the lower contribution base and the lower contribution rate of pensioners, a drop in contributions when we move to the retirement years of still active employees and to the already retired cohorts; from age 71 onward, contributions reduce to two age-independent rates, one for each gender, because our current database (the Austrian wage tax statistics, as mentioned above) simply does not provide an age classification of pension incomes beyond seventy.

On average, male individuals 16 years of age and older contribute EUR 1,476 and female individuals EUR 1,108 per year. The maximum contribution of an active man amounts to EUR 1,941, that of a male pension recipient beyond 78 amounts to EUR 756. On the other hand, women contribute EUR 1,513 at their labor income peak and EUR 599 from their pension when they are older than 78.

When we deduct from gross compulsory health insurance benefits the insurance contributions, we finally arrive at net benefits from compulsory health insurance. Taking account of contributions shapes average levels and age-gender profiles of benefits just according to the picture drawn in the lines above – and actually further sharpens the profiles already observed at the gross benefit level: The gross-net gap is more pronounced in the earlier and active years of contribution than in the later and retirement years and it is more pronounced for men than for women. Social insurance contributions are, after all, not designed to compensate for age-gender disparities; they actually, income-related as they are, inevitably further support (and are, after all, supposed to support) age-gender redistribution. It finally even turns out that active men in their 20s to mid-40s are *actually net contributors* to the scheme.

On average, men and women aged 16 and older receive net compulsory health insurance benefits of EUR 1,292 and EUR 1,956, respectively; the maximum values observed at advanced ages amount to EUR 7,274 and EUR 6,843.

We finally move, and this marks, so to speak, a sort of a final peak moment of this subsection, to the aggregate contribution and net benefit figures for the *overall* health and long-term care insurance system. They are, according to age and gender, presented in Figure 4, along with gross benefits (which are already familiar from Figure 2).

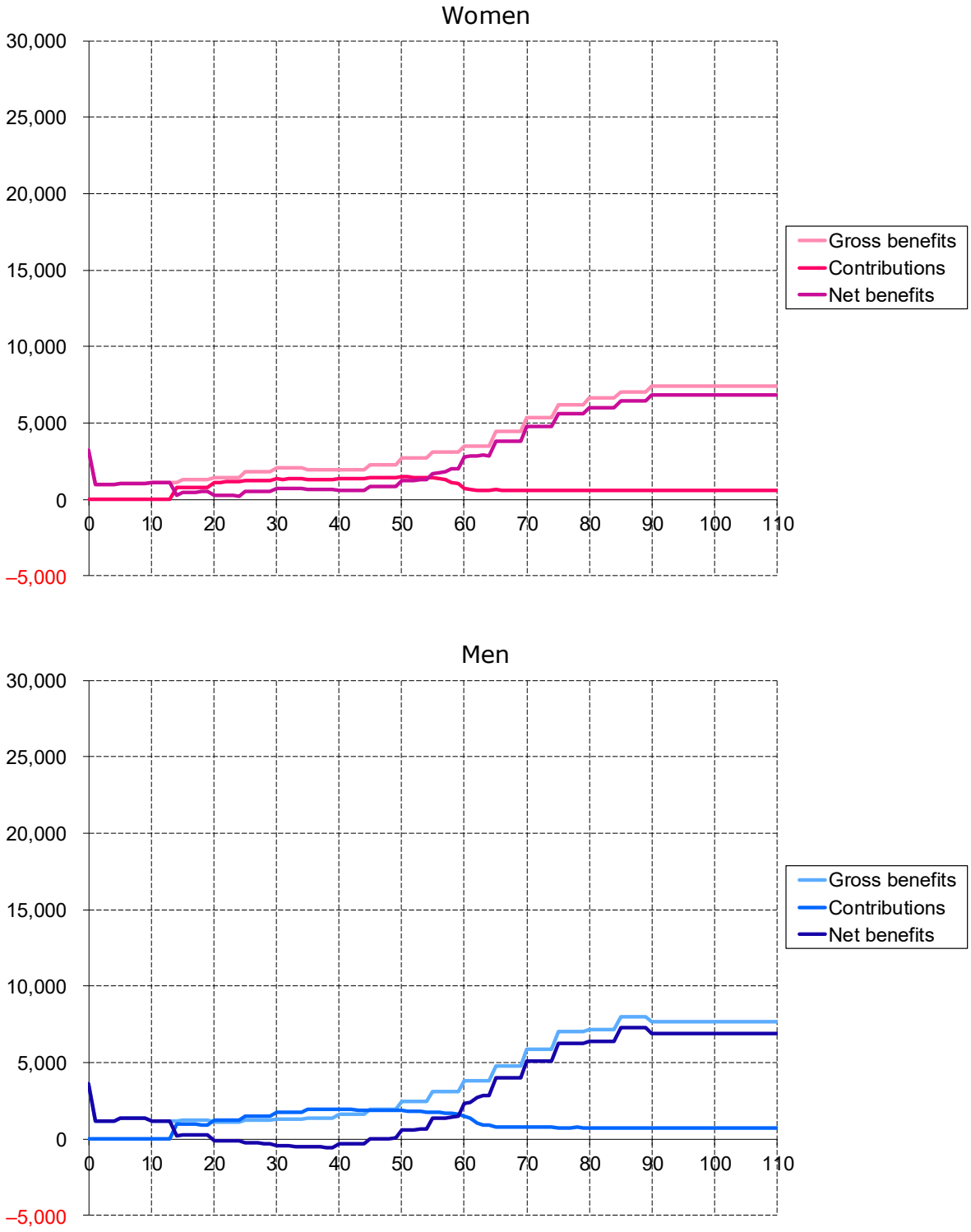


Figure 3: Compulsory health insurance benefits and contributions according to age (in EUR)

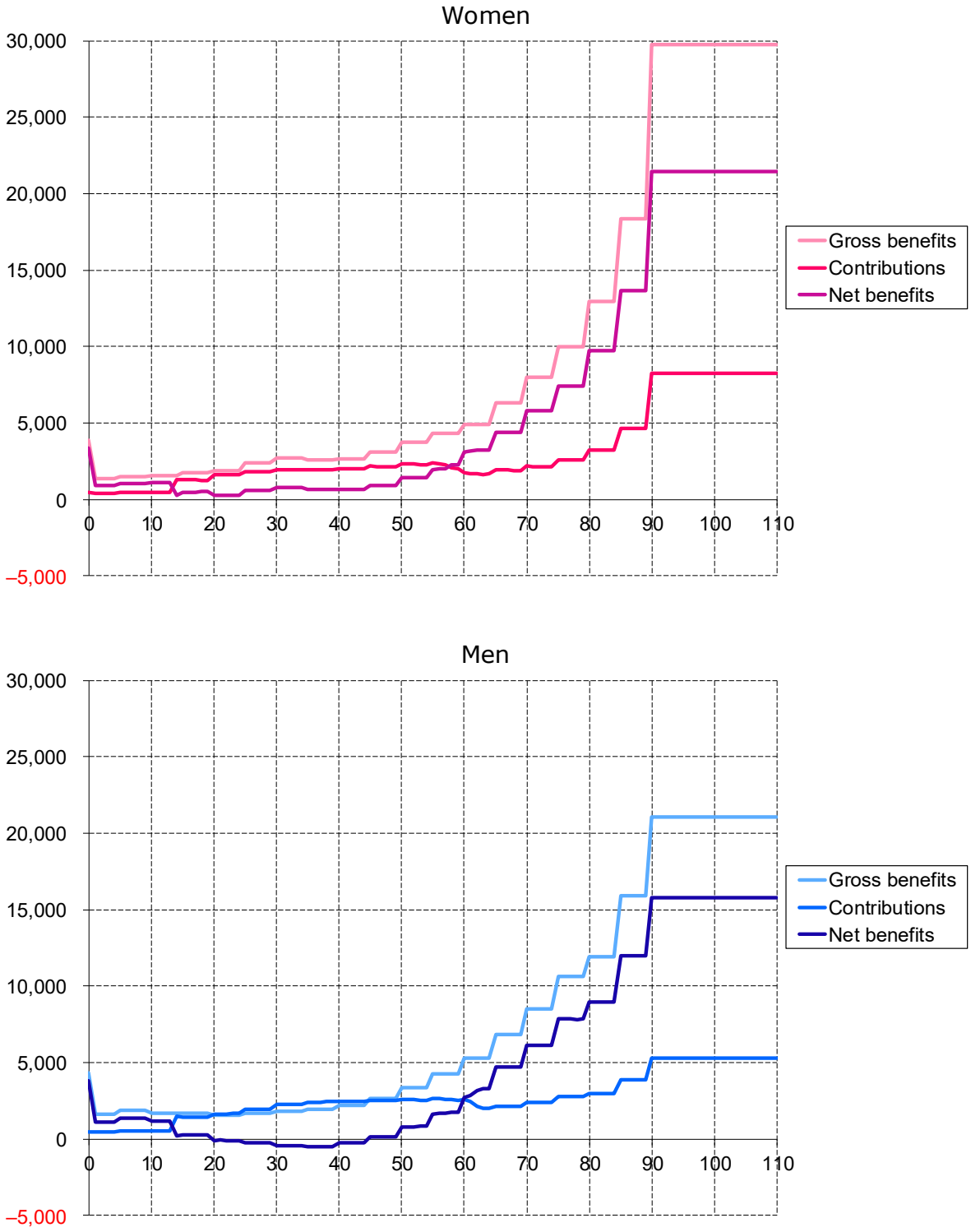


Figure 4: Health and long-term care insurance benefits and contributions according to age (in EUR)

Once we finally consolidate our four insurance and financing subschemes together again, we finally also combine together different regimes of age-gender redistribution: The just-described compulsory health insurance scheme, the by far largest one in money terms and the most important one contentwise, as we have seen rather redistributive both on the benefit and the contribution side, long-term care, the second most important contentwise, with a zero contribution but an even more redistributive benefit side, and two schemes where the age-gender profiles on the benefit side are basically derived from those two most important schemes: an only modest voluntary insurance scheme with a flat-rate contribution and the system of self-payments, which is, in money terms, actually the second largest scheme and which has no redistributional impact by definition.

When we finally want to take a closer look on the age-gender profiles of overall contributions and overall net benefits, this first glance does already yield first insights: We basically can focus broadly on compulsory health insurance in the stricter sense and long-term care, because voluntary health insurance is, all in all, simply too modest in size to make much of a difference and self-payments just do not have, as mentioned, any redistributional impact by definition; self-payments affect both sides, benefits and contributions, equally and in equal measure. They do have some effect on the contribution side, but ultimately, when it comes to net benefits, they will "cancel out".

When we move, at first, from compulsory contributions to overall contributions, the age-contribution curve undergoes an only slight parallel upward shift due to voluntary contributions and a more significant upward shift due to self-payments, the latter one basically resembling the age-gender profile of overall benefits and particularly replicating their accelerated increase at the advanced and very advanced ages, where the new maximum contribution values arise, EUR 5,284 in the case of men and EUR 8,274 in the case of women – way beyond the maximum values of compulsory insurance contributions, which are being paid during the peak active years of employment (EUR 1,941 versus EUR 1,513, see above). The inclusion of self-payments suggests that, at least on average, amounts of contributions paid by men versus women and, particularly and very significantly, those paid by active versus retired contributors undergo a certain convergence: The gap between men's and women's contributions – EUR 2,356 versus EUR 2,176 now – is more than halved and contributions of retirees are even surpassing those of active employees.

However, when we finally move to and want to understand the age-gender profiles of overall net health and long-term care insurance benefits, we can focus, for the reasons already explained, on contributions to and benefits from health insurance in the stricter sense and on long-term care benefits as the major components; we just have to put these pieces together again. Voluntary insurance is all too modest to make much of a difference and self-payments "cancel out"; compulsory insurance accounts, after all, for 97% of overall net benefits. As already addressed, the remaining three major components are all, to varying degrees, redistributing across ages and genders, and their redistributional impacts are finally cumulatively adding up and we can refer to the pieces of analysis above.

On average, men aged 16 and older receive overall net benefits of EUR 1,727 and women of the same age range EUR 2,648. And while, particularly, active men in their 20s to mid-40s are actually *net contributors* to the system, the maximum net benefit amounts received at very advanced ages, on the other hand, reach quite high levels, EUR 15,798 for male contributors and EUR 21,464 for women.

5.1.3 Gross health and long-term care insurance wealth

In this and the next subsection we present our macro-data-based present value estimates of gross and net health and long-term care insurance wealth and lifelong contributions for the average employee, classified by age and gender, by insurance and financing schemes (four again, compulsory health insurance in the stricter sense, long-term care, voluntary health insurance and self-payments) and by three discount rates (1.3%, 3% and 5%), everything for our base year 2017. Our calculations have again been based on the data sources and the methodology described above in sections 4.2 and 4.3.1; immediate key inputs are the flow data on annual benefits and contributions presented in the preceding subsections.

Figures 5 to 11 in the main text and figures A1 to A4 in the appendix[15] depict present values per capita by age, gender and insurance and financing scheme and under the three different discount rates, and table 3 shows the life-cycle maximum values and the average values for those aged sixteen and over, again for both genders and all schemes and under the three different discount rates. The figures related to the sum over all schemes and the two most important schemes, compulsory health insurance and long-term care, are included in the main text, the remaining figures, those related to voluntary insurance and self-payments, are located in the appendix.

We start with the estimates for gross health and long-term care insurance wealth. Figure 5 shows, under the three different discount rate assumptions (1.3%, 3% and 5%, respectively), the age- and gender-specific present values for the overall health and long-term care system, the aggregate over all schemes; figures 6 and 7 and figures A1 and A2 in the appendix provide the same presentation for our four subschemes.

In the base case of a 3% discount rate, overall gross health and long-term care insurance wealth amounts to EUR 172,728 on average across both genders and all age cohorts over 15 years. The age-gender patterns already observed in the benefit flow data are also reflected in the present values; the gender gap in the annual flows is now further reinforced by the well-known life expectancy gap.

Our estimate amounts to EUR 134,925 for a male newborn and to EUR 158,511 for a female newborn. It gradually builds up, for about the first half of life, over the years of age and peaks at EUR 166,795 for a 50-year-old man and at EUR 204,454 for a 55-year-old female. On average, a man of at least sixteen years has gross health and long-term care insurance wealth of EUR 153,669; in the case of a woman in the same age range, it amounts to EUR 192,322, which is approximately one-quarter higher.

Of course, and just as one would expect, the choice of the discount rate has a quite substantial effect, a well-known experience from previous social insurance wealth research: Lowering the discount rate to 1.3% increases gross insurance wealth of male newborns to EUR 327,125 and that of female newborns to EUR 412,037. The average values rise to EUR 235,453 and EUR 300,940, respectively. Here the values resulting for newborns are already the lifelong peak values; the discount rate is reduced down to, and hence fully compensated by, our annual rate of benefit indexation and a reduced discounting effect implies that the rising branch of the age-wealth curve is shifted and compressed to the left and in the extreme case completely "moved away". The other

[15] Again, as already in sections 5.1.1 and 5.1.2, all figures (with the exception of Figures A1, A3, and A4 in the appendix on voluntary health insurance wealth, which is simply all too modest in size) are of equal size and have the same maximum value on the y-axis, regardless of the size of the respective aggregate; this is intended to make the relative magnitudes immediately apparent and easily comparable.

way around, rising the discount rate to 5% reduces gross insurance wealth of male newborns to EUR 63,194 and that of female newborns to EUR 68,716. The peaks are pushed down to EUR 126,874 and EUR 155,013 (and the peak ages move to the right, to 65 and 70), and the averages to EUR 103,139 and EUR 126,852, respectively.

When we move further and allocate overall per-capita gross insurance wealth among our four insurance and financing schemes, the base case amount of EUR 172,728 breaks down as follows: EUR 103,106, at 59.7% the by far biggest share, constitute compulsory health insurance wealth in the stricter sense and EUR 29,650 or 17.2% long-term care insurance wealth. Together they account for a little more than three-quarters of overall per-capita gross insurance wealth; approximately the same magnitude we have observed above at the expenditure level. Only about 3.5%, EUR 6,036, constitute voluntary health insurance wealth and EUR 33,936 or 19.6% are finally self-payments out of the patients' own pockets.

Particularly the allocation to compulsory health care in the stricter sense versus long-term care somewhat depends on the choice of the discount rate: A higher discount rate of 5% changes the percentage shares to 61.2% and 15.6% (EUR 70,312 and EUR 17,970 out of EUR 114,831), respectively, and a lower discount rate of 1.3%, pretty conversely, to 57.9% and 18.9% (EUR 155,094 and EUR 50,850 out of EUR 267,743). The very distinct different benefit flow age profiles (see above section 5.1.1) have to be called to mind here; long-term care, particularly, actually occurs almost only at later ages, as we have seen, where the discounting effect becomes more and more noticeable.

The different age-gender profiles, particularly again if we look at compulsory health care in the stricter sense and long-term care as our primary focuses, reflect those already observed at the benefit flow level.

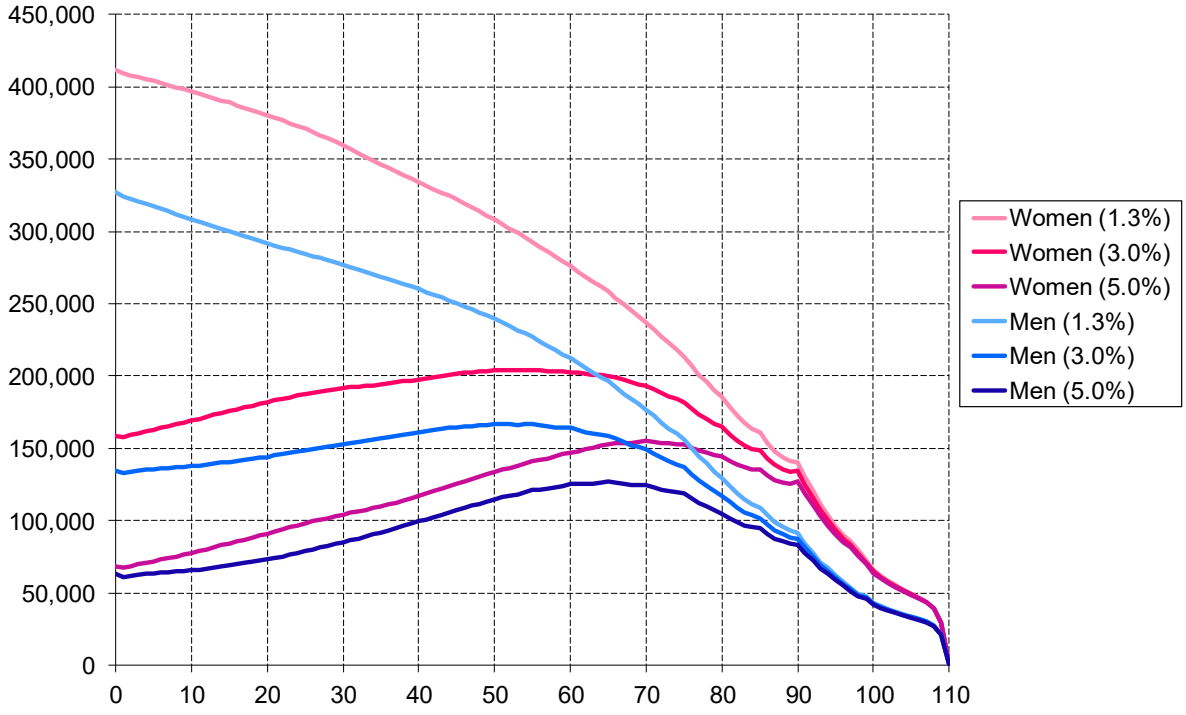


Figure 5: Gross health and long-term care insurance wealth according to age (in EUR)

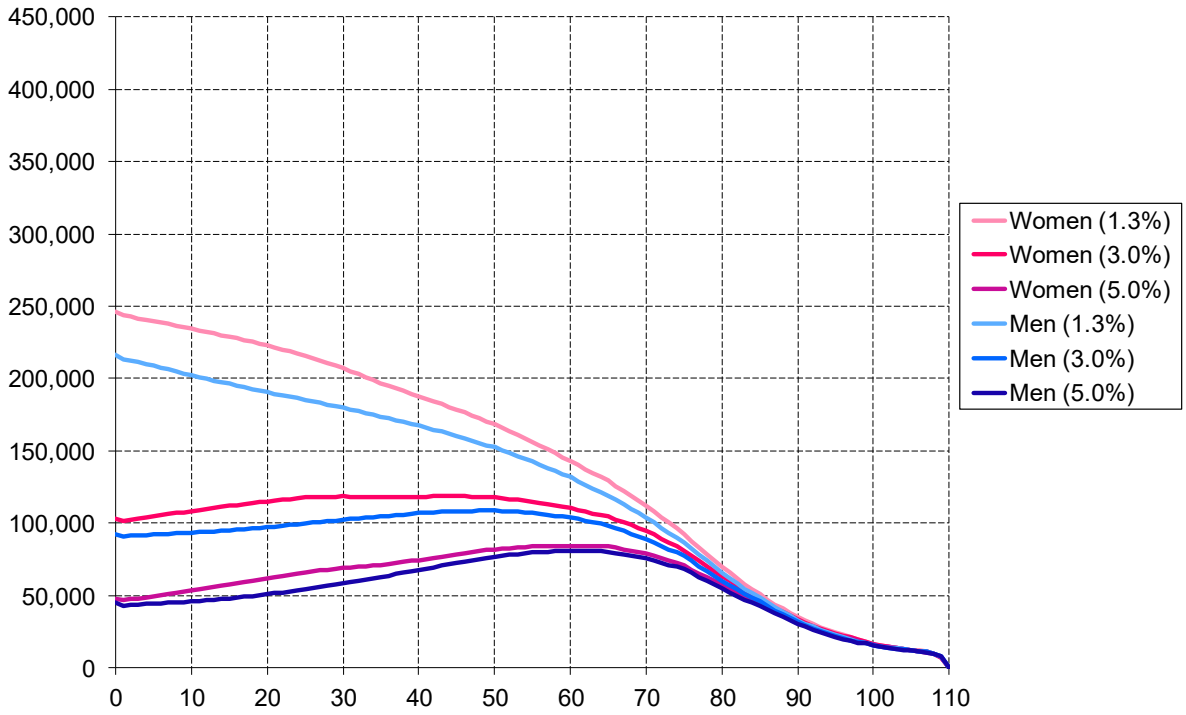


Figure 6: Gross compulsory health insurance wealth according to age (in EUR)

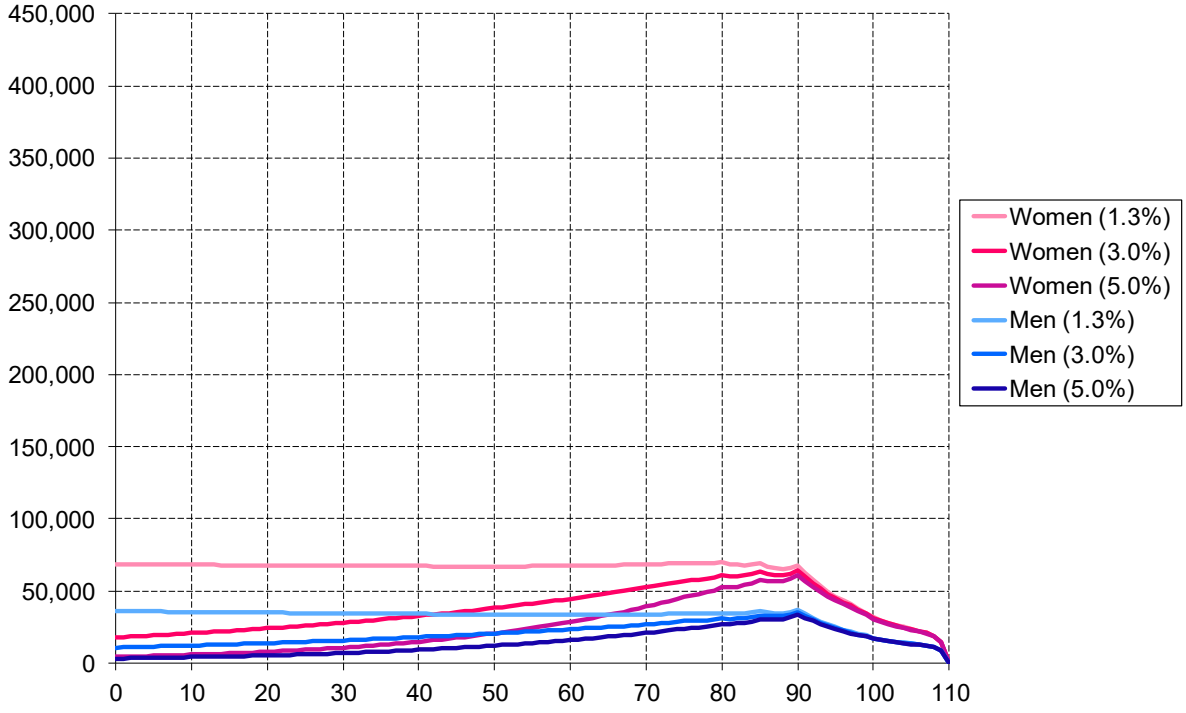


Figure 7: Gross long-term care insurance wealth according to age (in EUR)

Table 3: Health and long-term care

	1.3% discount rate							
	M		W		M+W		M	
	16+	Max	16+	Max	16+	Max	16+	Max
Gross insurance wealth								
Health and long-term care insurance	235,453	327,125	300,940	412,037	267,743	368,373	153,669	166,795
Compulsory health insurance	148,502	216,372	161,873	246,039	155,094	230,784	98,657	108,831
Long-term care	34,137	36,803	67,484	69,870	50,580	56,958	20,461	35,276
Voluntary health insurance	8,902	12,253	9,408	13,690	9,151	12,951	5,869	6,554
Self-payments	43,913	62,733	62,176	84,076	52,918	73,101	28,682	30,763
Contribution present value								
Health and long-term care insurance	95,346	165,858	100,664	166,632	97,968	166,232	66,696	90,638
Compulsory health insurance	48,644	98,339	35,570	77,452	42,198	90,383	35,920	60,122
Long-term care	0	0	0	0	0	0	0	0
Voluntary health insurance	2,789	5,163	2,918	5,342	2,853	5,250	2,093	3,194
Self-payments	43,913	62,733	62,176	84,076	52,918	73,101	28,682	30,763
Net insurance wealth								
Health and long-term care insurance	140,107	161,345	200,276	245,467	169,775	202,209	86,974	116,903
Compulsory health insurance	99,858	118,488	126,302	168,887	112,897	142,971	62,737	87,554
Long-term care	34,137	36,803	67,484	69,870	50,580	56,958	20,461	35,276
Voluntary health insurance	6,112	7,091	6,489	8,348	6,298	7,702	3,776	4,689
Self-payments	0	0	0	0	0	0	0	0

Note: M = men, W = women, 16+ = average for those aged 16 and above, Max = maximum value.

Source: Statistics Austria, Federation of Austrian Social Insurances, Austrian Labor Market Service, authors' calculations.

insurance wealth of active and retired employees
(per capita in EUR)

3.0% discount rate				5.0% discount rate					
W		M+W		M		W		M+W	
16+	Max	16+	Max	16+	Max	16+	Max	16+	Max
192,322	204,454	172,728	185,623	103,139	126,874	126,852	155,013	114,831	140,222
107,680	118,772	103,106	113,636	67,189	81,127	73,522	84,224	70,312	82,803
39,098	64,405	29,650	54,401	12,698	33,659	23,391	61,153	17,970	51,711
6,208	6,817	6,036	6,686	3,966	4,954	4,205	5,002	4,084	4,978
39,337	41,428	33,936	36,097	19,286	23,105	25,733	32,441	22,465	27,305
67,881	86,636	67,280	88,875	47,780	58,697	47,208	52,982	47,498	56,032
26,374	47,402	31,213	55,665	26,897	40,716	19,832	31,483	23,414	36,168
0	0	0	0	0	0	0	0	0	0
2,170	3,248	2,131	3,221	1,597	2,122	1,643	2,138	1,619	2,130
39,337	41,428	33,936	36,097	19,286	23,105	25,733	32,441	22,465	27,305
124,441	148,912	105,448	133,945	55,359	92,976	79,643	115,266	67,333	103,959
81,305	98,719	71,892	93,278	40,292	70,786	53,690	75,992	46,898	73,225
39,098	64,405	29,650	54,401	12,698	33,659	23,391	61,153	17,970	51,711
4,038	4,676	3,905	4,682	2,369	3,719	2,563	3,633	2,465	3,675
0	0	0	0	0	0	0	0	0	0

Under the base case, our estimates yield compulsory health insurance wealth of EUR 92,719 for a male newborn and EUR 103,103 for a female newborn and long-term care insurance wealth of EUR 10,737 versus EUR 17,862, respectively. Compulsory health insurance wealth gradually builds up and peaks under the base case at age 50 for men (EUR 108,831) and at 45 for women (EUR 118,772). Very simplified, the age-wealth curve broadly resembles that of overall insurance wealth, only compressed down and also somewhat to the left (because at advanced ages long-term care becomes dominant). Varying the discount rate has also basically a similar effect as above in the case of overall insurance wealth. The age gradient of long-term care insurance wealth is really very visibly shaped by the above-described very distinct age profile of long-term care benefit flows: Since long-term care is basically more or less restricted to the advanced ages of life, the peak and the downward branch of the age-wealth curve is positioned almost on the very right-hand side of the graph. (In the low-discount case, the pre-peak branch is actually flat, because the annual flows which determine the year-to-year slope are so insignificant.) Maximum values are reached in almost all cases only at ninety years of age, only women in the low-discount case peak "already" at 80. Under the base case, peak amounts equal EUR 35,276 for men and EUR 64,405 for women, respectively.

Across all schemes, as we have seen above, a woman's gross insurance wealth exceeds that of a man by about 25% in the base case; if we break it down into insurance schemes, a large part of this difference has to be allocated to long-term care, where women are in the lead with EUR 39,098 versus EUR 20,461, i.e. by more than 90%. The difference decreases with a rising discount rate (down to 84% under the 5% rate), again due to the high interest-rate sensitivity of long-term care present values. The gender gap is narrower when it comes to health insurance wealth in the stricter sense, which amounts (again under a 3% discount rate) in the case of compulsory insurance to EUR 98,657 for the average man and to EUR 107,680 for the average woman, which is about some 9% higher. It is even narrower still, less than 6% to be precise, in the case of voluntary insurance, where wealth averages out at EUR 5,869 for men and EUR 6,208 for women. Self-payments are, as one would expect (since their age profile shares characteristics with both health care and long-term care), somehow in between: Present values amount to EUR 28,682 (men) versus EUR 39,337 (women), which implies a gender gap of 37% (and the gap is again noticeably interest sensitive). The insurance wealth portfolio structure varies across genders quite in line with this: Under the base case, compulsory health insurance in the stricter sense contributes to overall gross insurance wealth for men a share of 64.2% and for women of only 56%, long-term care, on the other hand, contributes 13.3% for men but 20.3% for women (and under the 1.3% discount rate even 22.4%).

5.1.4 Net health and long-term care insurance wealth

We finally move on to complement our estimates of gross health and long-term care insurance wealth with figures for the present value of rest-of-life contributions paid in return and for the ultimate target of our calculations, net health and long-term care insurance wealth, the difference between these.

Again, we can refer here to our notes above on the flow level, main emphasis has to be laid on contributions for *compulsory health insurance*; voluntary health insurance is simply too modest in size to make much of a difference, insurance contributions for long-term care are nonexistent, which means that net benefits are equal to gross benefits, and in the case of services financed by self-payments contributions are simply equal to the value of benefits, which means that net benefits are zero.

Figure 8 shows, under the three different discount rate assumptions, age- and gender-specific present values for compulsory health insurance contributions. Examined across age cohorts, present values of compulsory insurance contributions basically reflect the three phases of contribution which we have identified already above on the flow level: The first 13 years of life when contributions are zero, the active years of life from 14 to 64, when the contribution base first increases and finally flattens out – with even a slight decrease after the peak active years –, and then a pronounced drop in the retirement years from 65 onward; they are easy to identify as three distinct segments of the age-present-value curve. They almost degenerate into three straight lines under the low-discount scenario, when the 1.3% discount rate is fully compensated by the 1.3% productivity growth rate, which implies that the year-to-year slope between two years roughly corresponds to the (negative of the) flow of the first of the two years: The first segment is almost flat, the second one an only slightly concave downward sloping line and the third one also downward sloping with the slope significantly reduced. Raising the discount rate implies that the first (strictly negative) effect, amounting to the one flow which drops out when you move from one year to the next, is overlaid by a second (and strictly positive) one due to the one-year shortened discounting period (apart of course from the obvious effect that the starting present value resulting for a newborn is going down). The first two segments are compressed downward, with the slope of the first one now being clearly positive and the second one exhibiting a more pronounced concavity. And the peaks move to the right, from 14 for both genders to 20 for men (and still 14 for women) and further to 25 for men and 20 for women.

On average, the present value of social insurance contributions paid by men and women of 16 years of age and older amounts to EUR 31,213 under the base case. (This is, see above, still below the gender-averaged present value of self-payments. While they may be not that much in our focus, because they "cancel out" in terms of net wealth, this emphasizes once again their significance in sheer money terms.) Men in this age range can be expected to contribute a present value of EUR 35,920 over their remaining lifetime and women EUR 26,374, which means that, after all, men contribute some 36% more over their remaining lifetime – again, we concede that plausible scenarios with some reasonable wage and pension convergence will lead to a less pronounced gender gap. Newborns face a lifetime contribution bill of EUR 47,206 and EUR 37,404 and the peak values amount to EUR 60,122 and EUR 47,402, respectively. Under the low discount scenario, average values increase to EUR 48,644 for men and to EUR 35,570 for women; values resulting for newborns, EUR 97,884 for male and EUR 77,152 for female newborns, are, as mentioned above, already very close at the peak amounts (EUR 98,339 and EUR 77,452, respectively). Raising the discount rate to 5% reduces the average values to EUR 26,897 and EUR 19,832, the start-of-life values to EUR 22,439 and EUR 17,962 and the peak values to EUR 40,716 and EUR 31,483, respectively. Again, we can observe that the choice of the discount rate has a quite substantial effect; the gender gap, however, turns out to be almost interest-insensitive (in percentage terms).

When we now offset the present value of compulsory health insurance contributions against our estimate of gross compulsory health insurance wealth, we finally reach the level of *true wealth* accounting and get a net figure for compulsory health insurance wealth. Figure 9 shows, under the three different discount rate assumptions, our age- and gender-specific net compulsory health insurance wealth figures.

We can basically draw on and merge together now what we have just outlined regarding present values on both the gross benefit and contribution sides and regarding the underlying net benefits at the flow level.

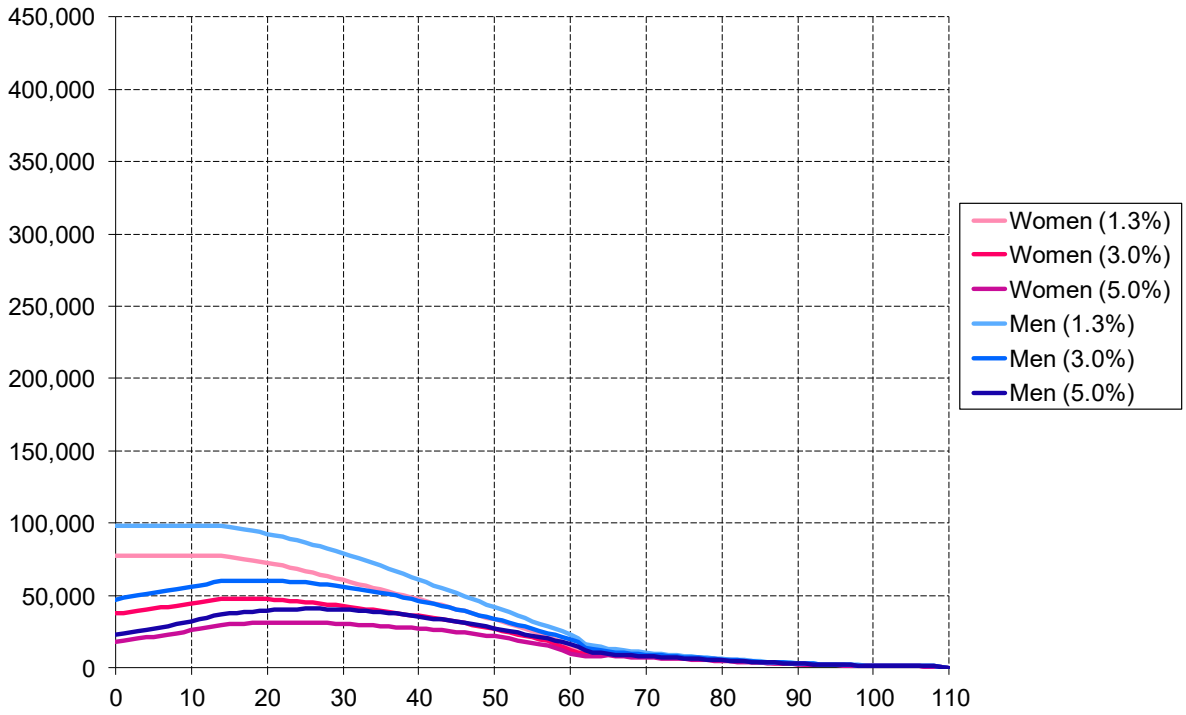


Figure 8: Present value of compulsory health insurance contributions according to age (in EUR)

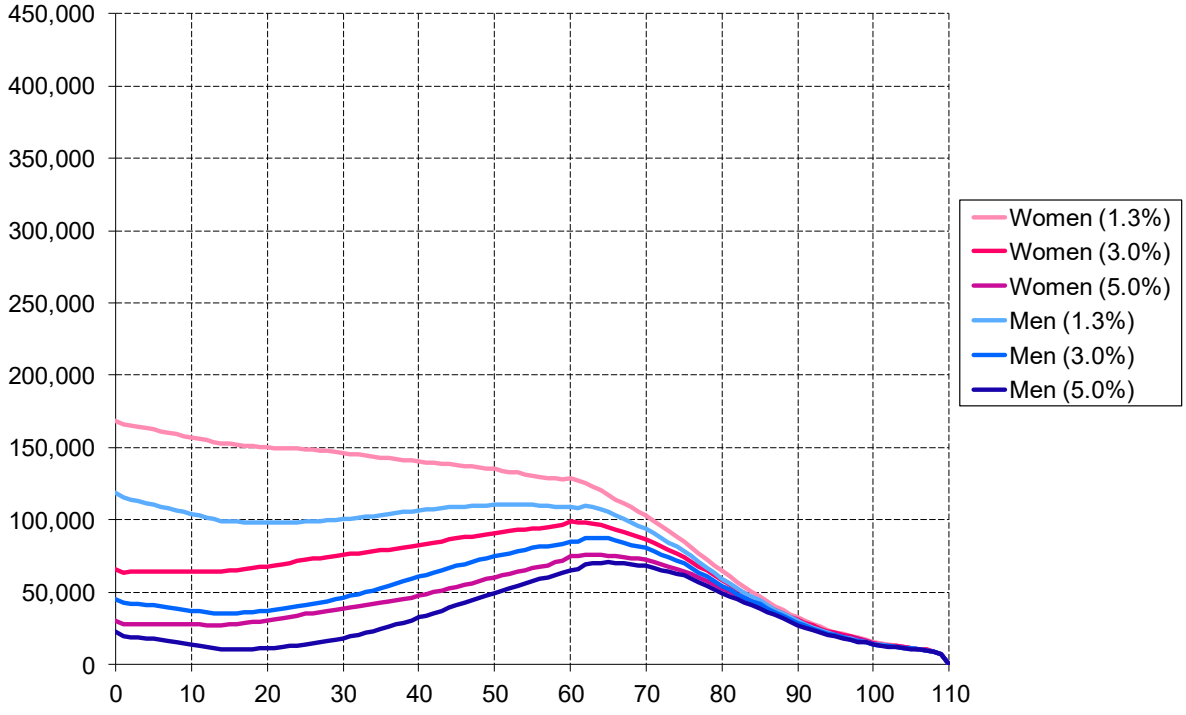


Figure 9: Net compulsory health insurance wealth according to age (in EUR)

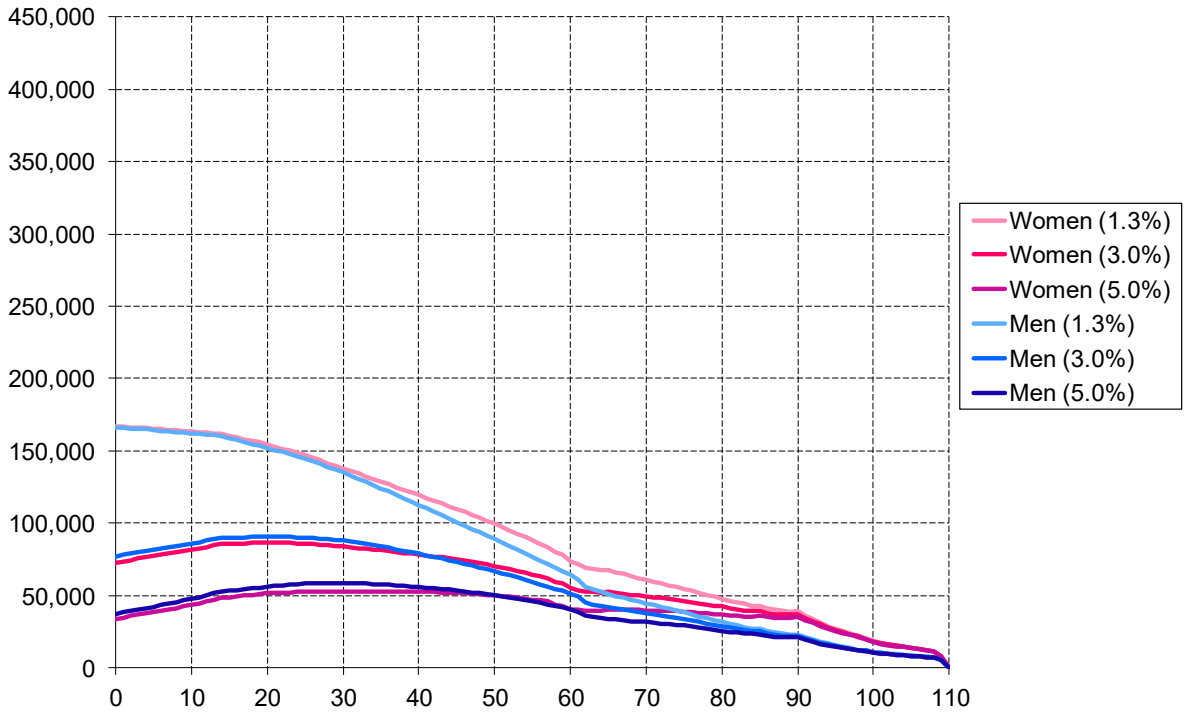


Figure 10: Present value of health insurance contributions according to age (in EUR)

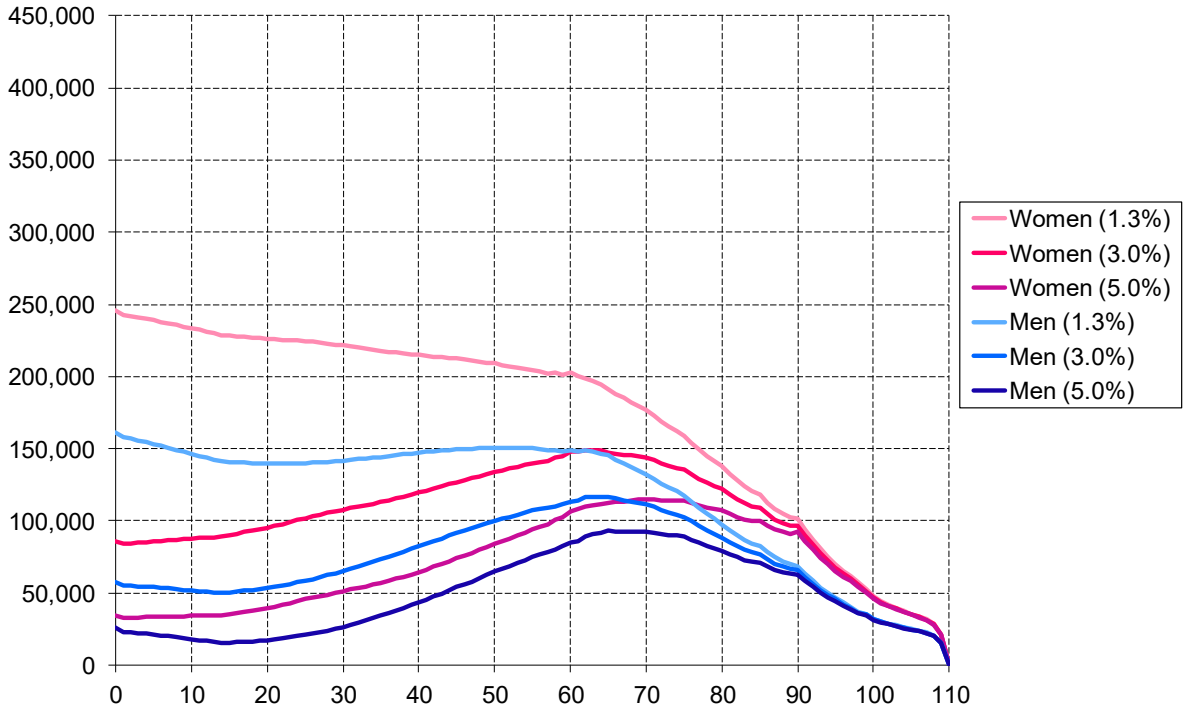


Figure 11: Net health and long-term care insurance wealth according to age (in EUR)

In the base case of a 3% discount rate, the average net compulsory health insurance wealth amounts to EUR 71,892 across both genders and all age cohorts above fifteen. Again, segmenting the life cycle very roughly into a manageable number of different phases of activity, contribution, and consumption helps in understanding the age-gender profiles and the interest sensitivity of the results.

To recapitulate and make it short: Gross benefits are, after an initial "postnatal" peak immediately in the first year of life, almost stable almost until the fifties, when they start to considerably accelerate up to their life peak values at the very advanced ages. On average, and particularly between 15 and 59, women receive higher benefits than men. Contributions are zero before age 14; from 14 to 64, they increase to their peak, flatten out and decrease slightly in the last years of activity and from 65 onward, they drop down to the significantly lower retirement level. Women contribute less than men on average.

To start with the starting values of the age-wealth curve, net compulsory health insurance wealth amounts to EUR 45,513 for a male and to EUR 65,698 for a female newborn under the base case. Lowering the discount rate to 1.3% increases these amounts to EUR 118,488 and EUR 168,887, respectively, while raising it to 5% reduces them to EUR 22,457 and EUR 30,072. Once again already at this point, and as trivial as it may sound, the choice of the discount rate is a very crucial one when it comes to the calculation of social insurance wealth.

In the low discount case, the present values adding up for newborns are, again, already the lifetime peaks, because the positive effect due to shortening the discounting period falls away. When the active years set in, men turn very soon, for about two-and-a-half life decades, into net contributors and at least their insurance wealth is rising now from year to year until their mid-fifties, but they still do not reach anymore the starting value. But then benefits accelerate progressively across both genders, and from the early sixties onward, net insurance wealth figures for both genders evolve in lockstep again and transition into a steady and pronounced decline over the remaining lifetime. An increase in the discount rate activates the positive age-related year-to-year compounding effect, causing net insurance wealth to rise with age during the active years of life. The peak ages move to the right, under the base case discount rate of 3% to 63 for men and to 60 for women, under a 5% rate to 65 and 63, respectively.

On average, net compulsory health insurance wealth accruing to men and women of 16 years of age and older amounts to EUR 62,737 and EUR 81,305 under the base case, respectively, which means that there is a gender gap in favor of women of about 30%. The peak values amount to EUR 87,554 and EUR 98,719. Under the low discount scenario, average values increase to EUR 99,858 for men and to EUR 126,302 for women; the values resulting for newborns, EUR 118,488 for male and EUR 168,887 for female newborns, are, as mentioned above, already the peak amounts. Raising the discount rate to 5% reduces the average values to EUR 40,292 and EUR 53,690 and the peak values to EUR 70,786 and EUR 75,992, respectively. The gender gap is somewhat interest-sensitive; it decreases and rises with the interest rate, under our two alternative scenarios to 26% and 33%.

We finally conclude this section with a sort of overall synthesis and proceed to our ultimate goal, the aggregate present value figures for contributions to and net wealth accrued through the overall health and long-term care insurance system, aggregated over all insurance and financing schemes.

The present value of overall contributions, presented according to age, gender and discount rate in figure 10, encompasses in addition to compulsory insurance contributions also contributions to voluntary health insurance and self-payments for health services. Although, as already addressed

earlier, they will not have much impact on our ultimate net wealth figure, because voluntary insurance is relatively modest in size and self-payments cannot generate any net benefit by definition, both schemes deserve at least a little attention if we want to complete our understanding of the overall contribution side.

As for voluntary insurance, we simply calibrated a per-capita flat contribution rate, such that the lowest of our net voluntary health insurance wealth values, the amount arising for a one-year-old male at a 5% discount rate, meets the zero constraint. This calibrated flat rate amounts to EUR 104. Figures A1, A3 and A4 in the appendix illustrate gross insurance wealth, the present value of contributions and net insurance wealth by age, gender and discount rate.

The present value of self-payments according to age, gender and discount rate is depicted in figure A2 in the appendix. Since the age-gender profile of self-payments is basically (see above) derived from overall health and long-term care insurance benefits, it will not come as a big surprise that the age-present-value curves are more or less only somewhat downscaled versions of the overall gross insurance wealth curves in figure 5. This, and here the results at the present value level just broadly reproduce those at the flow level, necessarily also implies that present values derived for women are significantly ahead and this further implies a gender convergence of lifetime contributions paid *overall* per capita. The gender gap observed in self-payments is interest sensitive (just as to expect, since it is primarily observed at advanced ages); it amounts to 37.1% under the base case, and to 41.6% in the low discount case and to 33.4% in the high discount case.

The resulting gender convergence in the present value of overall contributions is pretty striking; in the high discount case, overall contributions by men are still slightly ahead by 1.2% (ERU 47,780 versus EUR 47,208), in the base case, women are already slightly ahead by 1.8% (EUR 67,881 versus EUR 66,696), and in the low discount case, the margin increases to 5.6% (EUR 100,664 versus EUR 95,346). Particularly at higher ages, women contribute above-average (and here we see again the above-described effect of accelerating long-term care costs).

Figure 11 finally presents the ultimate target figure of our calculations, *overall net health and long-term care insurance wealth*, aggregated over all insurance and financing schemes and broken down according to age, gender and different discount rates. As already pointed out, basically three major components are aggregated together here, gross compulsory health insurance wealth in the stricter sense, compulsory health insurance contributions and long-term care insurance wealth. Hence, we basically add together our estimates of net compulsory health insurance wealth and long-term care insurance wealth (plus the very modest amount of voluntary health insurance wealth) and draw widely on the analysis above.

Under the base case, overall net health and long-term care insurance wealth amounts on average to EUR 105,448 per capita. This amount may be broken down as follows: EUR 71,892 or 68.2% are net compulsory health insurance wealth in the stricter sense. EUR 29,650 or 28.1% are long-term care insurance wealth. EUR 3,905, only about 3.7%, are net voluntary health insurance wealth.

The breakdown according to age, gender and different discount rates delivers results that look familiar. For newborns, overall lifetime net entitlements amount to EUR 58,065 in the case of males and to EUR 85,851 in the case of females. Variations of the discount rate have the usual significant effect; lowering it to 1.3% increases net insurance wealth to EUR 161,345 and EUR 245,467, raising it to 5% reduces them to EUR 25,941 and EUR 34,792, respectively.

In the low discount case, the present values adding up for newborns are, again, already the lifetime peak values, because the positive year-to-year compounding effect diminishes. Until the early 90s,

the age-wealth curve for overall net insurance wealth is almost a parallel shift of the compulsory health insurance wealth curve, because long-term care insurance wealth is more or less a flat line up to this point of age. Accordingly, the age profiles for overall and compulsory health insurance are very similar over this period of life and we can refer to the analysis above: After the first years on the labor market, men quickly turn into net contributors for about twenty-five years. Contrary to women, men's insurance wealth is rising now year after year until the men reach their mid-50s, without reaching the starting value again, however. Then benefits received by both genders start to accelerate progressively, and from the early 60s on, their net insurance wealth figures evolve in sync again, way down for the remaining lifetime. From the early 90s onward, both health and long-term care net insurance wealth are on the final decline – and this, now, under any discount rate.

But further away from the end of life, an increase in the discount rate does become significant, because the positive age-related compounding effect is adding up year by year, causing now both net insurance wealth components to rise with age. The peak ages are somewhat further to the right of those deriving for compulsory health insurance, because wealth figures for both major schemes move now in lockstep and their dynamics reinforce each other, under the base case discount rate of 3% at 65 for men and 62 for women, under a 5% rate at 65 and 70, respectively.

On average, overall net health and long-term care insurance wealth accruing to men and women of at least 16 years of age amounts to EUR 86,974 and EUR 124,441 under the base case, respectively. In other words, there is a gender gap in favor of women of about 43%. The peak values amount to EUR 116,903 and EUR 148,912. Under the low discount scenario, average values increase to EUR 140,107 for men and to EUR 200,276 for women. The amounts resulting for newborns, EUR 161,345 for male and EUR 245,467 for female newborns, are, as already mentioned and for the reasons already addressed, already the peak values. Raising the discount rate to 5% reduces the average values to EUR 55,359 and EUR 79,643 and the peak values to EUR 92,976 and EUR 115,266, respectively. The gender gap is not interest-sensitive; it remains quite stable at around 43%.

5.2 Results for the household level under stylized constellations

The health and long-term care insurance wealth figures presented in the previous subsection can also be used to calculate, under stylized family assumptions, insurance wealth amounts at the household level.

We categorize households according to the number of adults, according to whether these are contribution payers or not, and according to the number of dependent children in the household. This results in five household types as far as the adults' number, marital status and contribution status are concerned. Two types relate to single households, averaged across genders, that either pay contributions or not: "case 1" and "case 0" in the tables and figures below. The three other types relate to couple households consisting of one man and one woman, where either both pay contributions (case "1+1") or both do not ("case 0+0") or the man pays and the woman does not ("case 1+0"). In addition, we distinguish between another four cases of zero to three dependent children.

We basically only add up the net health and long-term care insurance wealth figures, which derive for all household members, in five-year steps over the whole life cycle of the adult household members, from age 15 onward. Couples are assumed to be of the same age and children to be conceived at ages 25, 30 and 35, respectively. We count children as dependent household members until age 15 (or, to put it the other way round, assumed to be "out of the house" at age twenty). As

far as their future contributions are concerned, we treat them like active employees who will retire at 65. However, we weight contribution bases with the age-specific rates of labor force participation and old-age pension receipt in 2016 (which implies that we accept that today's children will be to a certain extent also non-contributors, either, particularly, because they are still in education and training, because they are already out of labor force but not yet entitled to an old-age pension or because they are simply housewives).

We restrict ourselves to the base case of a 3% discount rate here. The results are shown in tables 4.0 to 4.3, which are dedicated separately to households with zero to three dependent children, respectively, and figure 12. In the tables, we refer, as a sort of "benchmark value", to the net conventional wealth amount of EUR 250,272 which was reported in the third wave of the Household Finance and Consumption Survey for the average Austrian household; values below that amount are shaded in grey. This benchmark is close to the EUR 245,051, which were reported by Knell and Koman (2022) as the average Austrian household's amount of pension insurance wealth.

We observe the typical and familiar hump-shaped pattern fundamentally underlying the age-wealth curves, which is basically inherited from the individual to the household level. But this already familiar age profile pattern is markedly overlaid by the impacts of the household type and the result is a wide variety of patterns among different household types. Net household health and long-term care insurance wealth is simply, for quite straightforward reasons, crucially impacted by the number of beneficiaries and the number of contributors in the household: The more who benefit, the higher it is, the more who contribute, the lower it is.

Already when we start with adult-only households (table 4.0), we end up with a quite widespread family of age-wealth curves. At the lower end, the starting value at age 15 amounts to EUR 63,935 for a single contributor household, and it more than doubles to EUR 152,477 for a single non-contributor. Single households' insurance wealth peaks at age 65 with EUR 132,538 for contributors, and at age 50 with EUR 185,623 for non-contributors. Contributions significantly delay the peak because they are primarily loaded on younger cohorts, as already observed above. For basically the same reason, because of the disproportionate contribution load on the earlier ages, a two-contributor household starts off with an even lower present value than a single non-contributor, namely at EUR 140,783. While lagging behind until their 20s, they finally overtake and pull away and peak with EUR 264,517 at age 65. Reducing the number of contributors further significantly increases insurance wealth, right from the start and throughout the whole life cycle. The starting values amount to EUR 226,442 and EUR 316,449 if one of the two does not contribute or if both do not, and the maximum values increase to EUR 317,227 and EUR 371,059, respectively. In the latter case of two non-contributors, the peak age moves back again, to 55 years.

When we also consider children and their insurance wealth entitlements, the distribution of household insurance wealth becomes further diversified; the number of dependent children becomes another key variable. Over the child-raising years, which in our stylized framework are the years from 25 to 50, household insurance wealth now receives another substantial temporary boost and the familiar hump-shaped pattern of the age-wealth curve develops into a sort of "hump-in-the-hump-shaped" pattern. (Of course, children's insurance wealth will not "disappear" afterwards; they are supposed to found their own households to which their remaining entitlements will then be allocated.)

Table 4.0: Household insurance wealth according to household structure (in EUR) – no children

Adults (contributor = 1, non-contributor = 0)					of age	Dependent children (of age)
1	0	1+1	1+0	0+0		
63,935	152,477	140,783	226,442	316,449	15	0
71,848	160,722	148,657	235,293	325,931	20	0
79,417	167,483	160,501	246,313	336,466	25	0
84,926	171,002	172,723	256,636	344,603	30	0
91,780	174,432	186,158	267,336	351,281	35	0
100,290	178,863	201,938	280,251	359,066	40	0
109,389	183,431	218,430	293,390	366,496	45	0
117,063	185,623	233,902	304,264	370,997	50	0
123,687	185,577	247,293	311,838	371,059	55	0
132,029	184,980	261,174	315,902	366,757	60	0
132,538	179,888	264,517	317,227	359,017	65	0
127,503	171,070	255,206	304,718	342,413	70	0
119,233	159,403	238,079	284,463	318,271	75	0
105,579	141,157	210,811	253,254	281,826	80	0
94,793	127,675	185,954	225,186	250,103	85	0
86,194	118,118	162,546	199,779	221,556	90	0
61,776	84,887	113,499	139,522	154,774	95	0
44,110	60,806	78,445	96,407	107,006	100	0
32,878	45,241	60,208	73,814	82,122	105	0
0	0	0	0	0	110	0

Table 4.1: Household insurance wealth according to household structure (in EUR) – 1 child

Adults (contributor = 1, non-contributor = 0)					of age	Dependent children (of age)
1	0	1+1	1+0	0+0		
63,935	152,477	140,783	226,442	316,449	15	0
71,848	160,722	148,657	235,293	325,931	20	0
160,317	248,383	241,401	327,213	417,366	25	1 (0)
164,584	250,660	252,380	336,294	424,260	30	1 (5)
172,117	254,769	266,494	347,673	431,618	35	1 (10)
175,083	253,657	276,731	355,044	433,859	40	1 (15)
109,389	183,431	218,430	293,390	366,496	45	0
117,063	185,623	233,902	304,264	370,997	50	0
123,687	185,577	247,293	311,838	371,059	55	0
132,029	184,980	261,174	315,902	366,757	60	0
132,538	179,888	264,517	317,227	359,017	65	0
127,503	171,070	255,206	304,718	342,413	70	0
119,233	159,403	238,079	284,463	318,271	75	0
105,579	141,157	210,811	253,254	281,826	80	0
94,793	127,675	185,954	225,186	250,103	85	0
86,194	118,118	162,546	199,779	221,556	90	0
61,776	84,887	113,499	139,522	154,774	95	0
44,110	60,806	78,445	96,407	107,006	100	0
32,878	45,241	60,208	73,814	82,122	105	0
0	0	0	0	0	110	0

Note: Adults are of the same age and children are conceived at ages 25, 30 and 35. Children are counted as dependent household members until age 15.
The HFCS reports an average of EUR 250,272 for private net household wealth; household insurance wealth values below that amount are shaded in grey.

Source: Statistics Austria, Federation of Austrian Social Insurances, Austrian Labor Market Service, authors' calculations.

Table 4.2: Household insurance wealth according to household structure (in EUR) – 2 children

Adults (contributor = 1, non-contributor = 0)					of age	Dependent children (of age)
1	0	1+1	1+0	0+0		
63,935	152,477	140,783	226,442	316,449	15	0
71,848	160,722	148,657	235,293	325,931	20	0
160,317	248,383	241,401	327,213	417,366	25	1 (0)
245,484	331,560	333,280	417,194	505,160	30	2 (0,5)
251,774	334,426	346,152	427,330	511,276	35	2 (5,10)
255,420	333,994	357,068	435,381	514,196	40	2 (10,15)
184,183	258,225	293,224	368,184	441,290	45	1 (15)
117,063	185,623	233,902	304,264	370,997	50	0
123,687	185,577	247,293	311,838	371,059	55	0
132,029	184,980	261,174	315,902	366,757	60	0
132,538	179,888	264,517	317,227	359,017	65	0
127,503	171,070	255,206	304,718	342,413	70	0
119,233	159,403	238,079	284,463	318,271	75	0
105,579	141,157	210,811	253,254	281,826	80	0
94,793	127,675	185,954	225,186	250,103	85	0
86,194	118,118	162,546	199,779	221,556	90	0
61,776	84,887	113,499	139,522	154,774	95	0
44,110	60,806	78,445	96,407	107,006	100	0
32,878	45,241	60,208	73,814	82,122	105	0
0	0	0	0	0	110	0

Table 4.3: Household insurance wealth according to household structure (in EUR) – 3 children

Adults (contributor = 1, non-contributor = 0)					of age	Dependent children (of age)
1	0	1+1	1+0	0+0		
63,935	152,477	140,783	226,442	316,449	15	0
71,848	160,722	148,657	235,293	325,931	20	0
160,317	248,383	241,401	327,213	417,366	25	1 (0)
245,484	331,560	333,280	417,194	505,160	30	2 (0,5)
332,674	415,326	427,052	508,230	592,176	35	3 (0,5,10)
335,078	413,651	436,726	515,039	593,854	40	3 (5,10,15)
264,519	338,561	373,561	448,520	521,627	45	2 (10,15)
191,857	260,417	308,696	379,057	445,791	50	1 (15)
123,687	185,577	247,293	311,838	371,059	55	0
132,029	184,980	261,174	315,902	366,757	60	0
132,538	179,888	264,517	317,227	359,017	65	0
127,503	171,070	255,206	304,718	342,413	70	0
119,233	159,403	238,079	284,463	318,271	75	0
105,579	141,157	210,811	253,254	281,826	80	0
94,793	127,675	185,954	225,186	250,103	85	0
86,194	118,118	162,546	199,779	221,556	90	0
61,776	84,887	113,499	139,522	154,774	95	0
44,110	60,806	78,445	96,407	107,006	100	0
32,878	45,241	60,208	73,814	82,122	105	0
0	0	0	0	0	110	0

Note: Adults are of the same age and children are conceived at ages 25, 30 and 35. Children are counted as dependent household members until age 15.
The HFCS reports an average of EUR 250,272 for private net household wealth; household insurance wealth values below that amount are shaded in grey.

Source: Statistics Austria, Federation of Austrian Social Insurances, Austrian Labor Market Service, authors' calculations.

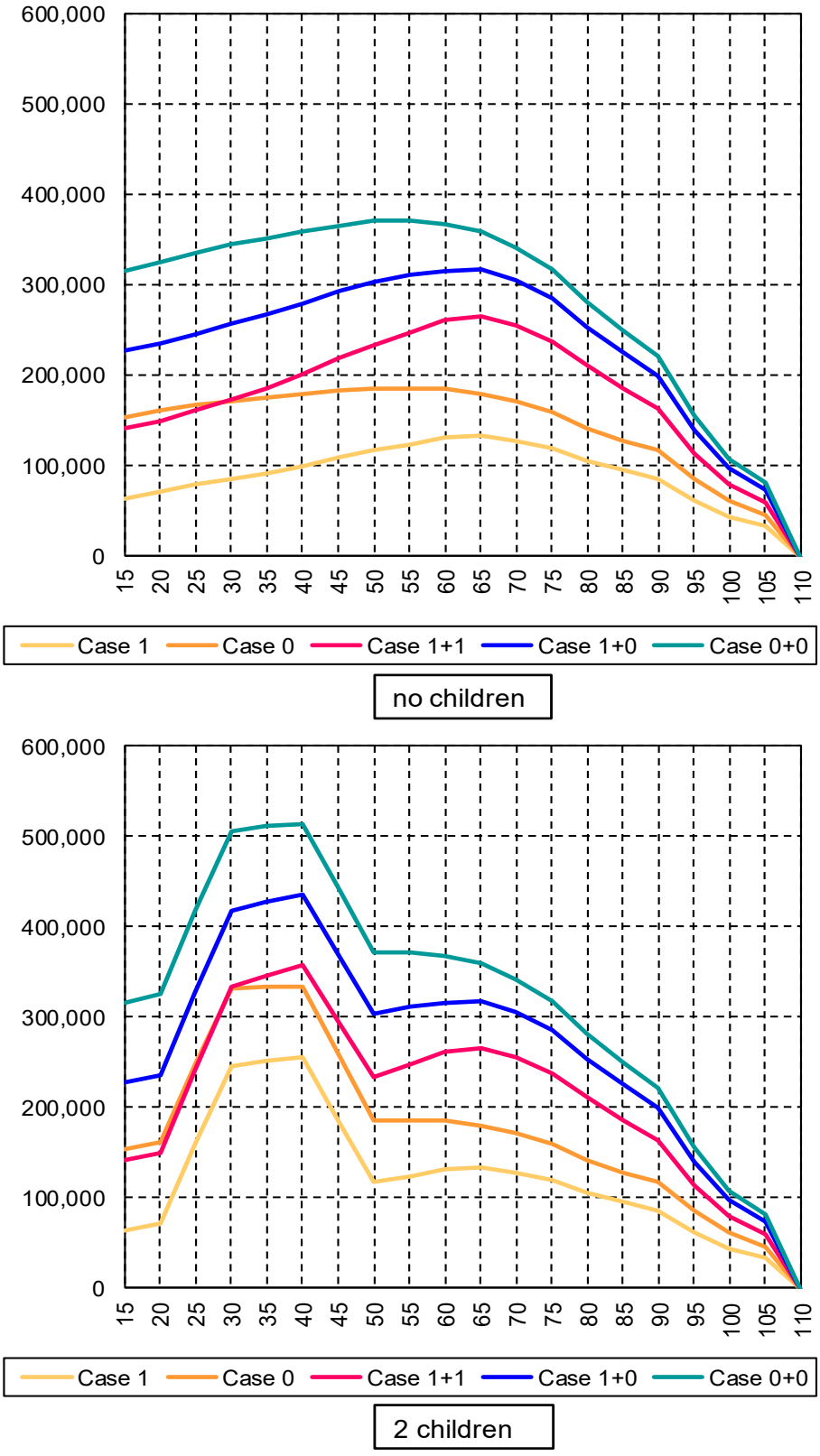
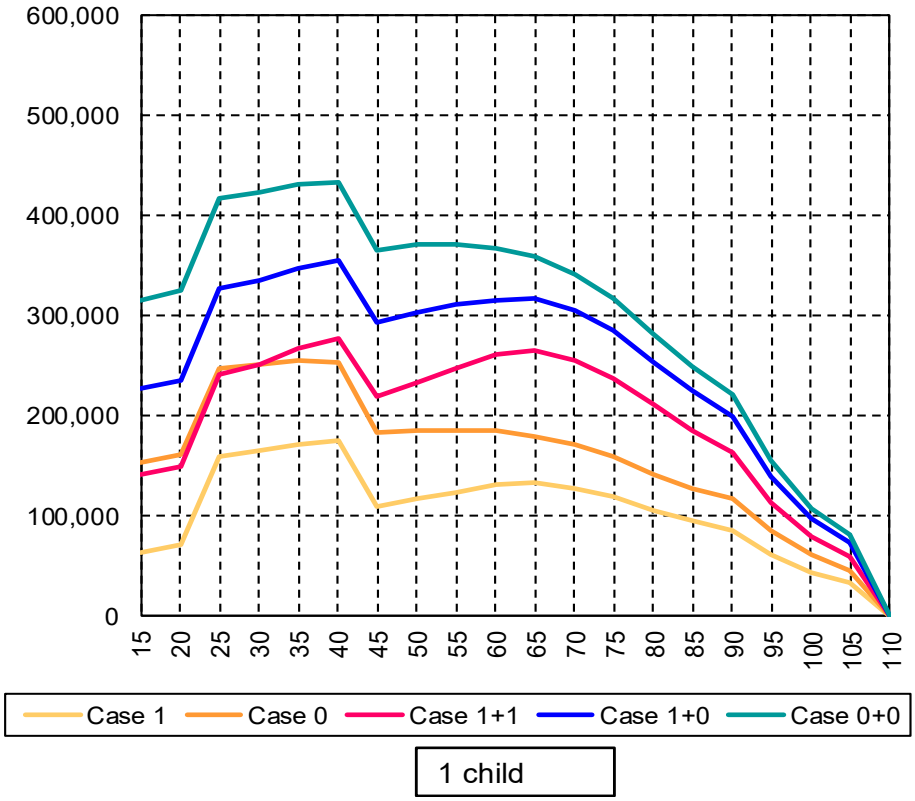
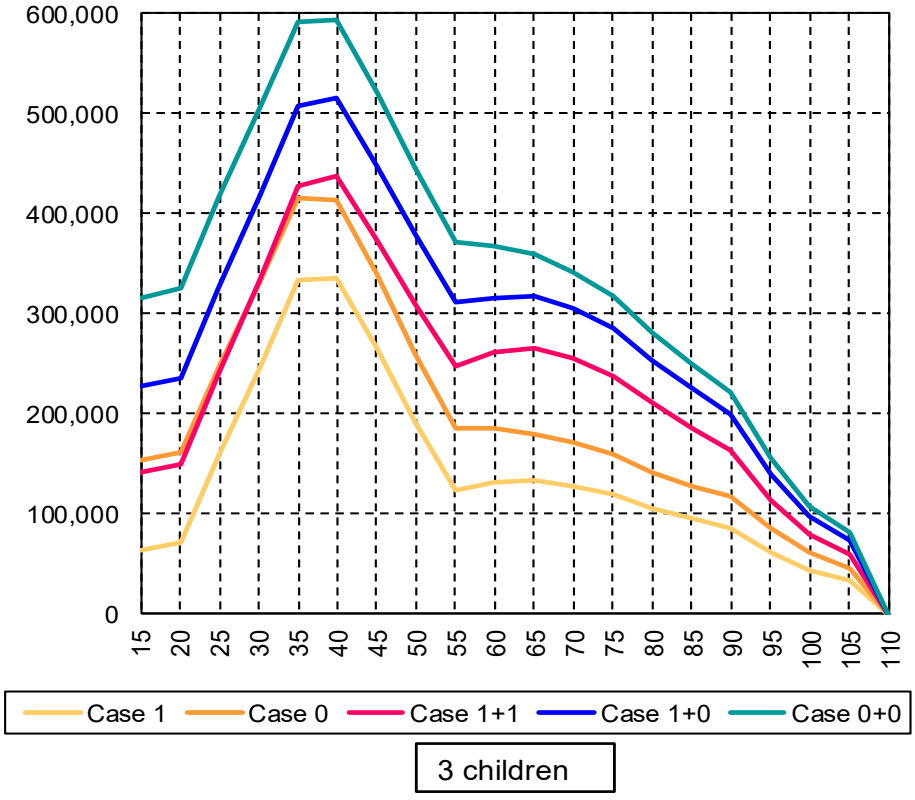


Figure 12: Household insurance wealth according to household structure and age (in EUR)



1 child



3 children

Consequently, the new peaks move into the "hump in the hump"; 40 is now the usual peak age, 35 in the case of a single non-contributor. The peak values increase substantially:

- for single contributors
  from EUR 132,538 to a range from EUR 175,083 to EUR 335,078
  depending on the number of children (always one to three),
- for single non-contributors
  from EUR 185,623 to a range from EUR 254,769 to EUR 415,326,
- for a two-contributor couple
  from EUR 264,517 to a range from EUR 276,731 to EUR 436,726,
- for a one-contributor couple
  from EUR 317,227 to a range from EUR 355,044 to EUR 515,039, and
- for a non-contributor couple
  from EUR 371,059 to a range from EUR 433,859 to EUR 593,854.

To summarize, net household health and long-term care insurance wealth increases with the number of adult household members, with the share of non-contributors among them and with the number of dependent children additionally covered by the insurance scheme. We now quickly go over the life cycle again, following a low-key periodization into what we defined above as "child-raising years" (broadly the mid-20s to the early 50s), the pre-child-raising years, the first half of the post-child-raising years (broadly the mid-50s to the early 80s) and the remaining advanced years of life (broadly from the mid-80s onward). And we again refer to the net conventional wealth "benchmark" of EUR 250,272, which was reported for the average Austrian household in the third HFCS wave, a value also close to the 245,051 euros which were reported by Knell and Koman (2022) as the average Austrian household's amount of pension insurance wealth.

In the pre-child-raising years, the large insurance benefits are yet to come, and household insurance wealth is still quite some way from any kind of peak. Nevertheless, insurance wealth levels are far from being downright insignificant, and couple households can come quite close to the HFCS net household wealth average if only one of the two is paying contributions (and we are speaking of young people in their early 20s here), and even clearly surpass the benchmark if both of them are not contributing.

For households with children, the child-raising years are the peak years, simply because the birth of each child temporarily increases the number of beneficiaries in the household. Household insurance wealth of a single contributor can reach or surpass the HFCS net wealth average with two dependent children, the amount deriving for a single non-contributor or a couple of contributors even with only one child. Couples with at least one non-contributor reach and surpass the HFCS net wealth average even without a child already at this age.

For households without children, the first half of the post-child-raising years are the peak years. For couples with at least one non-contributor, their household insurance wealth is always above the HFCS net wealth average. If both contribute, only the values deriving at the edges of this age group fall below that average.

From the mid-eighties to the early nineties onward, household net insurance wealth is on the final decline; this just reproduces what we have already observed at the individual wealth level. The values are also below the HFCS net wealth average; the closest one (and very close indeed) is the insurance wealth of two eighty-five-year-old non-contributors, EUR 250,103.

5.3 Results for the Household Finance and Consumption Survey

Finally, we present estimates and statistics on household health and long-term care insurance wealth for the household micro-data sample of the Austrian Household Finance and Consumption Survey. We draw on the data from the survey's third wave between November 2016 and July 2017 and use the methodology already described in sections 4.2 and 4.3.2. Again, our discount rate varies across three different rates, 1.3%, 3% (our base case) and 5%.

We restrict ourselves here to the two essential core subaggregates, to net compulsory health insurance wealth in the stricter sense and long-term care insurance wealth. This means that, first, we leave out the minor voluntary health insurance scheme and focus solely on the public health system. Second, we offset paid contributions from received benefits already right from the start. Our variables in focus are now, very specifically, household net compulsory health and long-term care insurance wealth and its two components.

Our estimates for these variables are presented together and in contrast with those for net household wealth in the conventional sense, and also sort of now and then, just in order to put them in the wider social insurance wealth context, with those of Knell and Koman (2022) for pension insurance wealth.

We proceed as follows: in subsection 5.3.1 and table 5, we present our global results on the average and the median level, i.e. average and median values of compulsory health insurance wealth in the stricter sense and long-term care insurance wealth. We also contrast them with HFCS figures for household net wealth in the conventional sense and its major components and aggregate them together with these into an augmented wealth figure.

In subsection 5.3.2 and table 6, we take this comparison further and deeper and compare the distribution of the different wealth, insurance wealth and augmented wealth aggregates at the percentile level.

From the results presented in these two sections we can already derive a number of inequality measures, which will be presented in subsection 5.3.3 and table 7.

Finally, subsection 5.3.4 and table 8 delve another layer deeper into the analysis and provide a comprehensive overview of the distribution of household wealth levels, both in the conventional and in the augmented sense, across various socioeconomic characteristics.

5.3.1 Aggregates and wealth composition

We first present our sort of summarizing estimates of average and median values for net health and long-term care insurance wealth in the HFCS sample of households, put them up for comparison against the already existing household net wealth figures in the conventional sense as presented in Fessler et al. (2018), and aggregate those two sets of estimates together into an augmented wealth estimate.

Table 5 does also provide measures for the most important net wealth subcomponents: Net overall household wealth is defined as the surplus of financial assets and real assets over total debt. Real assets can be broken down further into main residence property owned by household members, investment in self-employed businesses, and other real assets, such as vehicles, valuables and other real estate property. We do not only show the customary unconditional mean and median values, we also show the participation rates – the fraction of households that actually does hold a specific wealth component – and finally the means and medians for this subsample of households, the con-

ditional values. (Further details can be found and are discussed more extensively in Fessler et al., 2018).

Average overall net household wealth in the conventional sense amounts to EUR 250,272. The conditional and unconditional measures coincide because every household has at least some form of wealth or liability. At EUR 82,681, the median is considerably smaller, which immediately indicates a rather unequal distribution of net wealth across households. We will come back to this issue in detail in section 5.3.3.

Breaking down overall net household wealth into its subcomponents provides further interesting insights. The information about main residence ownership is particularly interesting: After all, its distribution can be called quite uneven; 54% of the sample households are non-owners, which is a high share by international comparison, and the unconditional median wealth value is actually zero. On the other hand, for many households, this subcomponent still represents the most important item of wealth. At least almost 46% of all households are owners of their main residence with a conditional mean value of EUR 289,112 and a median of EUR 250,000. For the subgroup of home-owners, the conditional mean of overall net wealth is EUR 476,301 (see table 7 in section 5.3.4 below), which means that the value of their main residence represents, on average, about 60% of their overall net wealth. The unconditional mean value amounts to EUR 132,825, which is still more than one half of average net household wealth.

Investment in unincorporated enterprises is, on the other hand, only observed for a minority of households, only about 7%, for whom, however, the conditional mean is outstandingly high, amounting to 661,534 euros. The unconditional average of EUR 46,284, is still second only to the average value of main residence property – apart from the residual category "other real assets".

"Other real assets", such as vehicles, valuables and other real estate property, average out at EUR 51,292. It is, being, after all, the residual category, a more widely distributed item of wealth; the participation rate is about 83%.

Almost every household, however, owns financial assets of some kind. It is the most widely distributed subcomponent of household wealth in the conventional sense; the average value amounts to EUR 38,637, with the median coming to EUR 15,460.

Finally, the unconditional mean of total household debt amounts to EUR 18,766. It must be noted, however, that more than two-thirds of Austrian households do not have any outstanding debt at all – arguably, to close the circle, the mirror image of the relatively low rate of home ownership.

We turn now to the ultimate goal of our work, to the evaluation of net health and long-term care insurance wealth at the household level. We find that the overall amount of insurance wealth is quite large and significant compared to conventional wealth measures. On average, net household health and long-term care insurance wealth amounts to EUR 238,353 under the base case of a 3% discount rate, which is very close to, only slightly below the 250,272 euros amount of average net household wealth in the conventional sense. And it is also very close to the average household pension insurance wealth amount of EUR 245,051 quantified by Knell and Koman (2022).

The conditional and unconditional means coincide, because every individual and every household is supposed to be covered by the public health system, and the median value, 225,651 euros, is, compared to the components of net wealth in the conventional sense, very close to the average value. This all does indicate from the start that the distribution of insurance wealth is pretty equal in comparison; we will dive deeper into that below.

Table 5: Household wealth – aggregates and wealth composition (in EUR)

	1.3% discount rate				3.0% discount rate				5.0% discount rate				PR
	Unconditional		Conditional		Unconditional		Conditional		Unconditional		Conditional		
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	
Net wealth	250,272	82,681	250,272	82,681	250,272	82,681	250,272	82,681	250,272	82,681	250,272	82,681	100.0
Financial assets	38,637	15,460	38,738	15,539	38,637	15,460	38,738	15,539	38,637	15,460	38,738	15,539	99.7
Main residence	132,825	0	289,112	250,000	132,825	0	289,112	250,000	132,825	0	289,112	250,000	45.9
Investment in self-employed business	46,284	0	661,534	108,133	46,284	0	661,534	108,133	46,284	0	661,534	108,133	7.0
Other real assets	51,292	7,900	61,570	10,000	51,292	7,900	61,570	10,000	51,292	7,900	61,570	10,000	83.3
Total debt	–18,766	0	–57,328	17,140	–18,766	0	–57,328	17,140	–18,766	0	–57,328	17,140	32.7
Net insurance wealth	405,080	319,851	405,080	319,851	238,353	225,651	238,353	225,651	148,421	144,410	148,421	144,410	100.0
Net health insurance wealth	294,628	218,841	294,628	218,841	177,331	157,985	177,331	157,985	112,501	109,083	112,501	109,083	100.0
Long-term care insurance wealth	110,452	101,182	110,452	101,182	61,022	60,922	61,022	60,922	35,920	33,871	35,920	33,871	100.0
Augmented wealth	655,353	462,000	655,353	462,000	488,625	340,464	488,625	340,464	398,693	241,506	398,693	241,506	100.0

Note: PR = Participation rate in %.

Source: HFCS, Statistics Austria, Federation of Austrian Social Insurances, authors' calculations.

At EUR 177,331, a little less than three-quarters (74.4%) of overall net household insurance wealth is accounted for by health insurance wealth in the stricter sense; the rest of EUR 61,022 (or 25.6%) by long-term care insurance wealth. These are roughly the proportions which we have seen at the individual level.

When we add up net wealth in the conventional sense and net health and long-term care insurance wealth, we arrive at a measure of augmented wealth. It amounts to 488,625 euros for the average household under the base case. Put in a nutshell, adding health and long-term care insurance wealth roughly doubles net household wealth in this case.

But, as we have already observed at the individual level, the results are highly sensitive to the discount rate. Lowering the discount rate to 1.3% increases health and long-term care insurance wealth by almost 70% to EUR 405,080 and augmented wealth by a little more than one-third to EUR 655,353; raising the discount rate to 5% reduces health and long-term care insurance wealth by roughly 38% to EUR 148,421 and augmented wealth by roughly 18% to EUR 398,693.

This means that the interest sensitivity seems to be even more pronounced than in the case of pension insurance wealth, where, according to Knell and Koman (2022), the 1.3% discount rate increases pension insurance wealth by one-third from EUR 245,051 to EUR 325,525, and the 5% rate reduces it by roughly one-quarter to EUR 185,937.

And, as we have already observed at the individual level, health care in the stricter sense and long-term care are affected differently by the choice of the discount rate. This is due to their very different benefit flow age profiles, which imply that the discounting effect becomes more noticeable in the case of long-term care. This makes the shares of the two schemes interest sensitive; lowering the discount rate to 1.3% increases the share of long-term care insurance wealth from 25.6% to 27.3%, while raising the discount rate to 5% reduces it to 24.1%.

5.3.2 Distribution by percentiles

This subsection zeros in on the issue of distribution. The previous subsection has already somehow touched upon the topic, in so far as we have also already presented and discussed participation rates and median values.

Table 6 now takes this up in more detail and presents a detailed percentile distribution – namely all deciles and the 1st, 5th, 95th and 99th percentile – of our set of variables, net household wealth in the conventional sense, our novel estimates of net household health and long-term care insurance wealth and the resulting measure of augmented household wealth.

It turns out that the first-glance impression from the previous section is further confirmed: To put it short and crisp, net household wealth in the conventional sense is quite unevenly distributed, and net health and long-term care insurance wealth is a whole lot more evenly distributed and substantially contributes to a more even augmented wealth distribution.

We just describe the overall pattern here and single out a few representative numbers; a more in-depth evaluation by several commonly used inequality measures will follow immediately in the subsequent subsection 5.3.3 and in Table 7.

When we compare the percentile distributions of net insurance wealth and net wealth in the conventional sense, we can easily observe, literally at a first glance, that insurance wealth is considerably higher at the lower end of the distribution and considerably lower at the upper end.

Table 6: Household wealth – distribution by percentiles (in EUR)

		1.3% discount rate				3.0% discount rate				5.0% discount rate			
	NW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW
Percentiles													
Percentile 1	–15,921	88,967	45,537	33,528	115,787	59,452	39,696	14,819	69,887	23,537	15,351	6,109	29,871
Percentile 5	42	119,114	68,096	33,701	147,897	82,177	51,062	18,796	102,650	42,991	32,528	8,968	57,853
Percentile 10	2,004	136,340	85,633	34,326	164,650	98,163	64,707	23,795	118,542	60,289	41,821	12,573	82,646
Percentile 20	8,436	159,328	110,143	67,287	211,510	115,030	78,243	34,304	147,004	83,281	57,695	18,714	111,099
Percentile 30	17,888	197,138	131,794	68,696	296,720	134,564	91,596	46,647	217,058	99,069	67,293	24,328	144,960
Percentile 40	35,368	261,142	170,681	100,733	382,716	177,100	118,901	55,744	271,720	109,196	76,324	29,463	196,075
Percentile 50	82,681	319,851	218,841	101,182	462,000	225,651	157,985	60,922	340,464	144,410	109,083	33,871	241,506
Percentile 60	154,190	350,693	249,160	102,209	593,128	246,103	177,810	66,842	423,083	173,588	128,622	38,864	319,522
Percentile 70	236,621	437,738	318,958	134,577	722,255	261,453	195,119	73,683	519,304	189,104	140,214	44,521	404,168
Percentile 80	325,888	633,570	475,458	168,873	948,528	338,759	262,848	81,833	642,012	199,472	153,652	50,681	519,861
Percentile 90	524,783	884,234	678,066	205,013	1,246,517	438,802	352,287	92,672	865,076	241,489	194,647	59,360	724,081
Percentile 95	865,897	1,026,775	783,752	239,055	1,594,040	521,738	416,352	105,364	1,175,313	281,679	229,599	71,273	1,056,862
Percentile 99	2,119,743	1,310,494	1,019,147	306,763	2,807,163	678,810	548,683	144,604	2,472,561	387,997	311,686	92,924	2,312,702

Note:
NW: Net wealth,
HLIW: Net health and long-term care insurance wealth,
HIW: Net health insurance wealth,
LIW: Long-term care insurance wealth,
AW: Augmented wealth.

Source: HFCS, Statistics Austria, Federation of Austrian Social Insurances, authors' calculations.

Table 7: Household wealth – inequality measures

		1.3% discount rate				3.0% discount rate				5.0% discount rate			
	NW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW
Percentile ratios													
P90/P10	262.0	6.5	7.9	6.0	7.6	4.5	5.4	3.9	7.3	4.0	4.7	4.7	8.8
P75/P25	21.6	3.1	3.3	2.0	3.4	2.4	2.7	1.8	3.4	2.1	2.3	2.2	3.8
P90/P50	6.3	2.8	3.1	2.0	2.7	1.9	2.2	1.5	2.5	1.7	1.8	1.8	3.0
Mean/Median	3.0	1.3	1.3	1.1	1.4	1.1	1.1	1.0	1.4	1.0	1.0	1.1	1.7
Gini coefficient	0.73	0.38	0.42	0.30	0.44	0.31	0.35	0.25	0.47	0.28	0.31	0.29	0.52
Top shares (in %)													
Top 1	22.6	3.7	4.0	3.1	9.6	3.1	3.4	2.6	12.3	2.7	3.0	2.8	14.8
Top 5	43.1	15.2	16.2	12.6	21.8	12.7	13.8	10.5	25.7	11.2	12.1	11.5	29.7
Top 10	56.4	26.8	28.5	22.6	32.4	22.7	24.4	18.6	36.0	20.0	21.5	20.4	40.6
Top 20	72.8	45.4	47.9	39.0	48.9	38.9	41.7	32.8	51.2	34.5	37.0	35.8	55.6
Top 50	96.4	76.2	78.6	70.3	79.5	72.0	74.6	67.1	80.4	70.7	72.5	70.9	83.3
Bottom 50	3.6	23.8	21.4	29.7	20.5	28.0	25.4	32.9	19.6	29.3	27.5	29.1	16.7

Note:
NW: Net wealth,
HLIW: Net health and long-term care insurance wealth,
HIW: Net health insurance wealth,
LIW: Long-term care insurance wealth,
AW: Augmented wealth.

Source: HFCS, Statistics Austria, Federation of Austrian Social Insurances, authors' calculations.

And of course, as usual, the choice of the discount rate has a significant effect, not only on the level of wealth and across the whole distribution, but also on the distribution itself. First, one of the immediate effects of a higher discount rate is that each and every discounted value has to go down, which has a leveling-out effect. In the extreme case, at very high discount rates – and beyond the levels we assume here – the present value of all future net benefits must in any case converge to zero and insurance wealth at a certain age converges to the net benefit flow accruing at this very age, which is the only one which is not subject to discount. Second, however, the social insurance scheme, which is now perhaps, but not necessarily, more evenly distributed, is now scaled down and loses weight due to the level effect. Thus, increasing the discount rate reduces not only insurance wealth, but also its redistributive impact although the scheme itself can become more evenly distributed.

At the lower end of the distribution, net household wealth in the conventional sense is even negative; households at the lowest percentile have EUR 15,921 net debt outstanding. On the other hand, the lowest percentile of net household insurance wealth already amounts to almost EUR 60,000 (exactly EUR 59,452) under the base case of a 3% discount rate. Lowering the discount rate to 1.3% increases it to EUR 88,967, while raising the discount rate to 5% reduces it to EUR 23,537.

At the upper end of the distribution, at the highest percentile, net household wealth in the conventional sense amounts to more than EUR 2.1 million, while household insurance wealth equals EUR 678,810 under the base case. Lowering the discount rate to 1.3% increases household insurance wealth to over EUR 1.3 million, while raising the discount rate to 5% reduces it to EUR 387,997.

If we were to draw curves, the percentile curve of household net health and long-term care insurance wealth would evolve almost linearly from the one end to the other. Net household wealth in the conventional sense, on the other hand, does not gain significant momentum until the median level and accelerates considerably afterward.

Now we have set the stage for and proceed further to the next subsection, which is dedicated to a deeper and more detailed distribution analysis, for which we use a variety of commonly employed inequality measures.

5.3.3 Inequality measures

From the wide variety of inequality measures available, we employ and present in table 7 what we hope is a representative subsample in order to get an encompassing picture of the distribution – they are all, in one way or another, related to and derived from the percentile distribution discussed above: (1) a number of percentile ratios, which quantify the ratio of wealth levels at different key positions in the percentile distribution, (2) the mean-to-median ratio, (3) a number of top and bottom shares, which quantify the share of wealth held by those above or below a certain percentile position and which deliver the data we find visualized in Lorenz-curve-style representations, and finally (4) the Gini coefficient, arguably the most prominent inequality measure, which is derived from and sort of summarizes this latter kind of representation.

Net wealth in the conventional sense is typically considered to be distributed quite unequally and can serve as our benchmark, against which we can evaluate our social insurance wealth and augmented wealth measures.

We start with the mean-to-median ratio. Average net household wealth in the conventional sense is as much as three times as high as the median value. This already indicates that the distribution is skewed to the right; the richer half is not only richer, but somehow disproportionately richer. Also, the percentile ratios paint a clear picture, indicating large disparities: The interdecile ratio, which compares the 9th to the 1st decile value, comes up to 262, the interquartile ratio, the ratio of the 3rd to the 1st quartile, amounts to 21.6, and the 9th decile is 6.3 times higher than the median. Bottom and top shares of wealth are highly disproportionate: The bottom 50% of wealth owners hold a mere 3.6% share of net wealth; 96.4% are held by the top 50%. The "upper ten percent" still hold significantly more than one half (exactly 56.4%) of total net household wealth, and the top 1% share still amounts to 22.6%. The resulting Gini coefficient amounts to 0.73 and is also high by international standards.

For net household health and long-term care insurance wealth, measured inequality is significantly less pronounced across the board, and this does also translate into a significantly more even augmented wealth distribution.

Average values are much closer to the median values; the mean-to-median ratios for health and long-term care insurance wealth are pretty close to 1.0 and the one for augmented wealth amounts to 1.4 under the 3% base case. Also, the percentile ratios are substantially lower. The interdecile ratio stands out particularly; it amounts to only roughly 4½ for overall net health and long-term care insurance wealth; to a little less than 5½ in the case of health care in the stricter sense and a little less than 4.0 in the case of long-term care. It drops sharply from 262 to 7.3 on the aggregate wealth level, when net wealth in the conventional sense is augmented by our insurance wealth measure. The bottom and top shares are considerably more balanced out; a considerably larger share of wealth is held by those at the lower end of the distribution: The bottom 50% hold 28% of overall net health and long-term care insurance wealth, a little more than one-quarter in the case of health care in the stricter sense and a little less than one-third in the case of long-term care – and this share increases quite sharply from 3.6 to 19.6 percent at the aggregate wealth level, when net wealth is augmented by health and long-term care insurance wealth. The top 10% and top 1% shares in overall net health and long-term care insurance wealth amount to 22.7% and 3.1%, respectively, and at the augmented aggregate level, they drop down from 56.4% and 22.6% to 36% and 12.3%, respectively. Finally, the Gini coefficient for overall net health and long-term care insurance wealth amounts to 0.31 – 0.35 in the case of health care in the stricter sense and 0.25 in the case of long-term care – and at the aggregate level, the augmentation of net wealth reduces it markedly, from 0.73 to 0.47.

Though impressive, these results are basically well in line with those presented by Knell and Koman (2022) for pension insurance wealth and the augmentation of household wealth by pension insurance wealth – albeit a little bit more accentuated. Just to give a quick comparison: The mean-to-median ratio is another little bit lower, 1.1 versus 1.2 in the case of insurance wealth and 1.4 versus 1.5 in the case of augmented wealth. The percentile ratios are also another bit lower – the interdecile ratio, for example, amounts to 4.5 versus 19.4 in the case of insurance wealth and to 7.3 versus 20.4 in the case of augmented wealth. The bottom and top shares are another bit more balanced out – the top 10% share, for example, amounts to 22.7% versus 28% in the case of insurance wealth and to 36% versus 38.1% in the case of augmented wealth. The Gini coefficient comes to 0.31 versus 0.45 in the case of insurance wealth and to 0.47 versus 0.53 in the case of augmented wealth.

And, finally and again, the choice of the discount rate has also some effect on the inequality measures. As already elaborated above, a higher discount rate can tend to make the insurance scheme's own distribution more equal, but the scheme as a whole is scaled down and loses weight, which tends to make the overall augmented wealth distribution more unequal – "more conventional". This is indeed reflected broadly, with only few exceptions, in the inequality measures in table 7. Just to pick out the Gini coefficient as the most prominent one: Reducing the discount rate to 1.3% raises the coefficient for the overall health and long-term care insurance scheme from 0.31 to 0.38, raising the discount rate to 5% reduces it to 0.28. For the overall augmented wealth distribution, on the other hand, the lower discount rate reduces the Gini coefficient from 0.47 to 0.44, the higher rate increases it to 0.52. This is once again rather in line with the results of Knell and Koman (2022), where the lower discount rate reduces the Gini coefficient for the augmented wealth distribution from 0.53 to 0.50, and the higher rate increases it to 0.56.

5.3.4 Distribution by socioeconomic subgroups

In this subsection, we provide a further breakdown of our aggregate average measures of households' conventional net wealth, social insurance wealth, and augmented wealth according to various socio-economic characteristics. The results are summarized in table 8.

All in all, we cover ten socioeconomic characteristics. Four of them are actually not household but individual characteristics, which refer to the household's "financially knowledgeable person"[16]: age, gender, education and occupation. Only the remaining six actually refer to the household as a whole: household size, the type of residential area where the household is living, and finally four characteristics which could be called, in a wider or a stricter sense, income and wealth characteristics: homeownership, the receipt of an inheritance and finally actually income and net wealth.

The distribution according to age, we distinguish here four age groups, up to 24, 25 to 39, 40 to 59 and 60 and older, shows the familiar hump-shaped pattern. Additionally, however, and as we have already seen in the sections above, the age profile of health and long-term care insurance wealth is shaped by further particular factors of influence here: First, the choice of the discount rate plays the usual important role and particularly affects the younger cohorts, whose insurance wealth is based on benefits which will be received in a more distant future. Second, during the typical child-raising years, household insurance wealth is particularly increasing with the number of dependent children in the household. Whereas, thus, household net wealth in the conventional sense, and, as Knell and Koman (2022) have shown, also pension insurance wealth, peaks somewhere towards the late 50s or early 60s, the peak of net household health and long-term care insurance wealth moves towards what we have called above the "hump in the hump" in the typical child-raising years: In the 3% base case, the age group 25 to 39 is already a very close second, almost on a par with the age group 40 to 59, which is the actual peak age group, according to the classification applied here, for net wealth in the conventional sense. In the low-discount case it *is* already the peak age group. And in both cases, the age group 60 or older is actually the one with the lowest household insurance wealth. Only when we increase the discount rate further to 5%, do the younger households fall further back and the age group 40 to 59 is now firmly established as the undisputed peak age group.

[16] This is the person those survey questions are directed to which pertain to the household *as a whole*, because he is considered by the household members to be most familiar with the household's finances (see Albacete et al., 2019). This is not necessarily the reference person according to the Canberra definition (see United Nations, 2011). The latter is the reference person used by Knell and Koman (2022), which, unfortunately, somehow impairs the comparison.

Table 8: Household wealth – distribution by socioeconomic subgroups (in EUR)

	1.3% discount rate					3.0% discount rate				5.0% discount rate			
	NW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW	HLIW	HIW	LIW	AW
Age (years)													
0–24	190,486	422,709	318,358	104,351	613,196	200,051	158,072	41,979	390,537	96,629	80,008	16,621	287,116
25–39	129,868	562,286	428,608	133,678	692,154	269,852	214,903	54,949	399,720	133,571	110,883	22,688	263,440
40–59	331,491	477,876	353,983	123,893	809,368	274,573	210,571	64,002	606,064	162,642	128,999	33,643	494,133
60+	245,191	239,676	155,408	84,268	484,866	188,100	124,503	63,598	433,291	148,358	100,450	47,908	393,549
Gender (male, female)													
Male	267,420	379,548	279,024	100,525	646,968	227,804	171,296	56,508	495,223	143,840	110,226	33,613	411,259
Female	236,818	425,115	306,872	118,242	661,932	246,631	182,067	64,564	483,448	152,015	114,285	37,730	388,833
Household size (number of persons)													
Single	147,931	160,897	107,184	53,714	308,828	111,729	75,438	36,291	259,660	79,743	54,481	25,263	227,674
2	246,694	337,114	233,770	103,344	583,808	227,927	162,303	65,624	474,621	158,266	115,627	42,639	404,960
3	322,373	605,166	452,419	152,747	927,539	327,243	253,024	74,218	649,616	184,688	147,228	37,460	507,061
4+	447,938	990,725	760,772	229,954	1,438,663	497,061	397,386	99,675	944,999	262,867	217,778	45,089	710,805
Education (level 1: apprenticeship, level 2: mastership or GCE A level, level 3: university)													
Level 1	159,845	395,173	287,605	107,568	555,018	235,776	175,305	60,471	395,621	148,992	112,739	36,252	308,837
Level 2	286,662	422,206	307,144	115,062	708,869	246,022	183,304	62,718	532,684	151,666	115,229	36,437	438,328
Level 3	531,893	401,729	291,273	110,456	933,622	229,118	170,220	58,898	761,011	137,601	104,409	33,192	669,494
Income (distribution in quintiles)													
Quintile 1	67,684	223,530	155,558	67,972	291,214	150,533	106,013	44,520	218,217	106,275	75,616	30,659	173,959
Quintile 2	112,603	291,234	207,937	83,298	403,837	181,901	132,097	49,804	294,504	120,653	88,820	31,833	233,256
Quintile 3	179,112	404,858	295,690	109,168	583,971	239,315	179,030	60,285	418,427	150,613	114,981	35,632	329,726
Quintile 4	260,542	514,472	380,172	134,300	775,014	291,024	221,295	69,728	551,565	173,443	135,235	38,209	433,985
Quintile 5	631,971	591,760	434,130	157,630	1,223,731	329,211	248,398	80,813	961,182	191,223	147,942	43,281	823,194

Occupation (self-employed, either in trade and industry or as a farmer, one of 3 types of employees, pensioner, other)													
Self-employed	992,793	503,769	371,466	132,303	1,496,561	279,331	212,949	66,381	1,272,123	160,477	126,154	34,323	1,153,270
Blue-collar	137,194	478,191	360,055	118,136	615,386	257,704	201,409	56,295	394,898	144,287	116,789	27,498	281,481
White-collar	233,894	515,453	385,133	130,321	749,347	268,785	208,542	60,242	502,678	145,336	116,863	28,474	379,230
Civil servant	300,993	504,634	375,555	129,079	805,627	283,811	217,929	65,882	584,804	165,680	131,121	34,559	466,673
Pensioner	198,666	242,035	157,522	84,514	440,702	187,857	124,630	63,227	386,523	147,070	99,683	47,387	345,737
Other	175,785	477,162	360,984	116,178	652,947	265,497	208,195	57,301	441,282	155,744	126,072	29,672	331,529
Net wealth (distribution in quintiles)													
Quintile 1	–2,904	344,085	253,977	90,108	341,181	194,930	147,406	47,524	192,026	117,661	90,597	27,065	114,757
Quintile 2	19,402	349,356	252,916	96,440	368,759	202,303	149,619	52,684	221,705	124,234	93,383	30,851	143,636
Quintile 3	86,730	391,679	283,454	108,225	478,409	230,653	170,503	60,150	317,382	143,776	108,104	35,673	230,506
Quintile 4	236,828	421,787	303,653	118,134	658,616	258,768	190,444	68,324	495,596	166,848	125,262	41,586	403,676
Quintile 5	912,240	518,692	379,275	139,416	1,430,931	305,239	228,776	76,464	1,217,479	189,670	145,221	44,449	1,101,910
Homeownership (owner, renter, free usage)													
Owner	476,301	466,136	338,914	127,222	942,437	278,358	207,032	71,326	754,659	175,553	133,140	42,414	651,855
Renter	57,311	368,146	269,512	98,634	425,457	209,876	157,715	52,161	267,188	126,377	97,070	29,307	183,688
Free usage	63,774	256,308	175,880	80,428	320,082	168,574	115,645	52,930	232,348	118,778	81,293	37,484	182,552
Inheritance receipt (no, yes)													
No	139,557	385,245	280,174	105,072	524,803	225,640	168,004	57,635	365,197	139,754	106,074	33,680	279,311
Yes	431,453	437,540	318,283	119,257	868,993	259,157	192,594	66,563	690,610	162,603	123,017	39,585	594,056
Residential area type (rural, urban)													
Rural	298,033	427,530	311,447	116,083	725,564	251,494	187,431	64,063	549,527	156,782	119,048	37,733	454,815
Urban	168,165	366,486	265,714	100,773	534,652	215,762	159,969	55,793	383,927	134,046	101,244	32,802	302,211

Note:
NW: Net wealth,
HLIW: Net health and long-term care insurance wealth,
HIW: Net health insurance wealth,
LIW: Long-term care insurance wealth,
AW: Augmented wealth.

Source: HFCS, Statistics Austria, Federation of Austrian Social Insurances, authors' calculations.

A breakdown by gender reveals that households tend to have lower net wealth in the conventional sense (EUR 236,818 versus EUR 267,420), but higher net health and long-term care insurance wealth (EUR 246,631 versus EUR 227,804 in the base case), if a female is our reference person, the household's "financially knowledgeable person". This should not come as a surprise, however, considering that such households are on average likely to be dominated by women, and taking into account the income gender gap and the reverse insurance wealth gender gap, which we have examined in detail in the sections above.

Household size has already been identified in the previous subsection as a primary driver of net household health and long-term care insurance wealth: To cut it short, the more who benefit, the higher it is, quite necessarily. And it is not surprising that it appears to increase with household size at least as pronouncedly as, if not even more so than net wealth in the conventional sense: The share of adult household members tends to decrease with the size of the household. This must somehow have a dampening effect in the case of net wealth in the conventional sense, but not so, as we have seen above, in the case of health and long-term care insurance wealth. In the base case, the average single household's net wealth in the conventional sense amounts to EUR 147,931 and its net health and long-term care insurance wealth to EUR 111,729. Stepping up to four or more household members increases these amounts to EUR 447,938 and EUR 497,061, respectively. This represents approximately a threefold increase in the one case, but nearly a four-and-a-half-fold increase in the other. Household size does also work quite different here than in the case of pension insurance wealth, where entitlements actually *decrease*, on average, after the second household member, arguably and understandably because larger household sizes are associated with less full-time work among adult household members (Knell and Koman, 2022).

While net wealth in the conventional sense is highly correlated with educational attainment, and pension insurance wealth, though less so, still also to some extent, this variable seems to have, in comparison, only little impact on health and long-term care insurance wealth: We distinguish three educational levels here, namely (1) apprenticeship, (2) mastership or GCE A level and (3) university. Upskilling from one level to the next increases net household wealth by about 80% on average. When we move across the discount rates of 1.3%, 3%, and 5%, insurance wealth increases by only 7% to 2% from level 1 to level 2 and actually decreases by 5% to 9% from level 2 to level 3. What could be the reasons for this? To begin with, received gross benefits – at least according to our definition – are not affected by the level of education per se. A higher level of education will typically imply higher income and, hence, higher contributions and lower net insurance wealth. On the other hand, when people's level of education rises, their age likewise advances, and, as we have seen, insurance wealth can either increase or decrease with age. With qualification progress and an improving career, people tend to settle down to start a family, which increases the household size and insurance wealth temporarily at least. To sum it up, the overall effect can be positive or negative, and we do not see a clear-cut tendency – what we can definitely say is that what we measure here is not really noticeable. The picture might change if we apply, another challenge yet to be taken up, income-dependent mortality and survival rates.

Table 8 also provides a distribution across income quintiles. Net household wealth in the conventional sense is highly correlated with household income, which is hardly surprising and almost self-evident. Average net household wealth amounts to EUR 67,684 in the lowest income quintile and to EUR 631,971 in the highest. This correlation intuitively makes sense as higher income provides greater opportunities for savings and investments, thereby increasing net wealth, and wealthy people are also supposed to have better career opportunities. Also, the distribution of pension insurance wealth to a certain degree reflects the distribution of income, particularly in a pension system

of the "Bismarckian" type, such as the Austrian one (see Knell and Koman, 2022). But table 8 also shows a positive correlation between income and net health and long-term care insurance wealth, which, while not as strong as between income and net wealth in the conventional sense, is still quite significant: Average net household health and long-term care insurance wealth amounts to EUR 150,533 in the lowest income quintile and to EUR 329,211 in the highest. Although it looks quite remarkable at first sight, this result must be interpreted with considerable caution, however: First of all, income, and this marks a crucial difference between health and pension insurance wealth, particularly in a Bismarckian-type pension system, does not enter as an explanatory variable in our measure of gross insurance wealth; received health and long-term care benefits are equal across all income levels. As mentioned above, a meaningful channel to consider would be the use of income-dependent mortality and survival rates. At this stage of our modeling, however, income only enters as the assessment base for social insurance contributions, which implies that income actually would only have a *negative* effect on *net* insurance wealth. The positive correlation which we observe in table 8 is actually rather a case of spurious correlation, and, obviously, the confounding variable seems to be *age*. Age enters the present value formula for insurance wealth multiple times: as the lower bound of summation, through the age-gender profile of the received age-dependent benefits, through the exponent of the discount factor, and through the age-dependent conditional survival rates. The result is the hump-shaped age-wealth curve, which we have encountered again and again throughout this study. And income indeed exhibits a rather similar age pattern. A good case in point is the very wage data underlying the compulsory health contribution flows and which we already dealt with in detail in section 5.1. Wage income is zero before age 14, the first working year; from 14 onward, it increases steadily to its peak in the late 50s, then it flattens out and decreases slightly in the final years of activity. From 65 onward, income drops down to the significantly lower retirement pension level. This really sort of mimics the hump-shaped age pattern of net health and long-term care insurance wealth. The two variables literally sort of rise and decline in lockstep.

The results of the breakdown by occupation are somewhat similar to those for educational attainment. Net household wealth in the conventional sense varies quite significantly across occupational groups. It amounts to EUR 992,793 for the average household of self-employed reference persons. This amount is outstandingly high compared to the wealth levels of employees and pensioners, more than seven times the EUR 137,194 net wealth amount reported for the average blue-collar working class household. There is also a fairly significant, though not as impressive, inequality among different employee groups: Net wealth amounts to EUR 233,894 for the average white-collar employee household and to EUR 300,993 for civil service households, which equals about 170% and 220% of the blue-collar level, respectively. And pensioner households' net wealth amounts to EUR 198,666 on average, which is almost one half beyond the blue-collar level. Already the variation of pension insurance wealth across occupational categories has turned out to be much smaller than that of net wealth in the conventional sense (see Knell and Koman, 2022). In the case of health and long-term care insurance wealth, however, the dispersion among economically active households almost disappears, which does not come as a surprise. Under the 3% base case, net health and long-term care insurance wealth amounts to EUR 279,331 for households of self-employed persons and to EUR 257,704, EUR 268,785 and EUR 283,811 for blue-collar, white-collar and civil servant households, respectively. Nor does the choice of the discount rate have too much of an impact on the distribution, because, on average, all active beneficiaries are equally affected age-wise. Pensioner households, however, are different: Their insurance wealth is comparatively less affected by the choice of the discount rate, because their benefits are less distant in the future. Under the base case, their insurance wealth amounts to EUR 187,857, which is only

73% of the blue-collar level. Under the 5% discount rate, they are already almost exactly on the same level; under the 1.3% discount rate they are already nearly 50% behind.

The distribution of insurance wealth across net wealth quintiles shows again an example of spurious correlation, similar to the distribution across income. But, just as it is important to note that there is no causal effect of net wealth in the conventional sense on net health and long-term care insurance wealth (at least according to our current specification; income-dependent mortality and survival rates might, as already mentioned, turn out to be a game changer, to some extent), it is also important to see how insurance wealth smoothens the distribution: Average net wealth in the lowest quintile is negative (–EUR 2,904), and in the second and in the highest quintiles, it amounts to EUR 19,402 and EUR 912,240, respectively. Net health and long-term care insurance wealth averages out at EUR 194,930 and EUR 202,303 in the two lowest net wealth quintiles and at EUR 305,239 in the highest one under the base case, and augmented wealth amounts to EUR 192,026 and EUR 221,705 in the lowest two quintiles and to EUR 1.2 million in the highest. This means that the lowest net wealth quintile average increases through the augmentation of wealth from a negative value to almost EUR 200,000, and the ratio of the highest to the second quintile decreases from almost 50 to 5½.

The remaining three variables again show some spurious correlation with net household health and long-term care insurance wealth and they again illustrate how insurance wealth smoothens the distribution. The variables are two subcategories of wealth, namely *"homeownership"* and *"inheritance receipt"*, and *"residential area type"*. Under homeownership, we distinguish between households that own or rent their main residence or live there for free. Under inheritance receipt, we distinguish whether the household has received an inheritance or not. Under residential area type, we distinguish between rural and urban households.

See table 8 for details. As one would expect, net wealth in the conventional sense is much higher in owner households: their net wealth is more than eight times as high as that of renters (EUR 476,301 versus EUR 57,311). It is also remarkably higher, again not quite surprising, in households that have received an inheritance: their average net wealth is more than three times as high as that of those without an inheritance (EUR 431,453 versus EUR 139,557). Most interestingly, rural households' average net wealth is almost 80% higher than that of urban households (EUR 298,033 versus EUR 168,165). This result is tightly linked to high homeownership in rural compared to urban areas, and to a lesser extent to differences in inheritances.

Again, insurance wealth shows much less dispersion across these characteristics. Under the base case, "homeownership", "inheritance" and "rural area" are associated with an insurance wealth advantage of a comparatively modest 33%, 15% and 17%, respectively (EUR 278,358 versus EUR 209,876; EUR 259,157 versus EUR 225,640; EUR 251,494 versus EUR 215,762). And again, insurance wealth significantly smoothens the overall distribution: The factors "homeownership", "inheritance" and "rural" are significantly reduced from the abovementioned initial values, from over 800% to 282%, over 300% to 189% and almost 180% to 143%, respectively. The augmented wealth levels finally amount to EUR 754,659 versus EUR 267,188; EUR 690,610 versus EUR 365,197 and EUR 549,527 versus EUR 383,927.

To sum it up, the distribution of household health and long-term care insurance wealth by socioeconomic subgroups is pretty much shaped by the underlying individual-level patterns: We observe the quite familiar hump-shaped age pattern and the also already familiar female-favoring gender gap; this simply reflects how gross benefits and incomes and contributions are distributed over the

life cycle of men and women. Household size is also a very crucial factor; this moves the peak point towards earlier age groups, the usual child-raising years.

Age, gender and household size patterns do have some similarities with those observed for wealth in the conventional sense and pension insurance wealth, but there are also some notable differences. And, what makes health and long-term care insurance wealth different once again, there is also no noticeable effect of educational attainment and occupation. We do observe some correlation with income and net wealth in the conventional sense, only – again in comparison with conventional wealth and pension insurance wealth – very modest, however, and only spurious in nature. It is as it is: Social health and long-term care insurance benefits are essentially very uniformly distributed.

And, quite eye-catchingly, the overall net wealth distribution is significantly smoothened by the augmentation with health and long-term care insurance wealth.

6. Summary and outlook

In this paper, we calculated and presented measures of health and long-term care insurance wealth in Austria for the year 2017. To our knowledge, this is the first time that this health-related insurance wealth has been calculated in a form that makes it comparable to the pension insurance wealth and conventional wealth based on international microeconomic survey standards. As a result, we contribute a further important notional wealth component that helps augment conventional wealth measures and comprehensive wealth analyses. Public unfunded pension insurance schemes and public unfunded insurance health care coupled with long-term care programs are in advanced economies often the two most important budgetary items (that are often distributed across different layers of government). Estimating the corresponding notional wealth of these annual public expenditure for individuals or households and comparing them with conventional wealth – property plus financial assets minus debt – is highly relevant for both macroeconomic temporal and intertemporal analyses as well as microeconomic distributional considerations.

As regards the estimated magnitude of the health and long-term care insurance wealth in Austria, we can conclude that the average per household value is indeed sizable and of the same magnitude as the estimated pension insurance wealth and the conventional wealth measure. Each of these amounts to about one-quarter of a million EUR per household. As regards the distributional impact, it is similar to existing estimates of pension insurance wealth, with health-related insurance wealth being more equally distributed than pension insurance wealth, which, in turn, is more equally distributed than net wealth in the conventional sense, the latter being highly unequally distributed in the population when using traditional measures such as the Gini coefficient. As a result, the augmented wealth measure – financial and property wealth minus debt, augmented by insurance wealth – is significantly more equally distributed than assets in the conventional sense. The Gini coefficient of the augmented wealth measure reaches magnitudes that we know from inequality measurement of flows, such as income.

We are aware that measures of social insurance wealth and augmented wealth have to be calculated and also interpreted generally with great care. Our measures are intended to *supplement* and not *replace* conventional wealth measures and conventional wealth reporting. We have also pointed out areas of possible improvement, and will return to that below.

As regards the results in a bit more detail, using data of different sources, we can also offer basically three different sets of measures: As for the benefits accruing to the insured, we rely on the System of Health Accounts, a satellite account to the System of National Accounts, from which we can derive, per capita, age- and gender-specific gross health and long-term care benefits and gross insurance wealth amounts.

Since we aim to quantify the true wealth impact of health and long-term care insurance, we also need to come up with annual flow and present-value estimates of insurance contributions paid in exchange for the received insurance services. Here we have used both macro- and micro-level data.

At the macro level, we drew on social insurance and tax statistics data, deriving contributions and insurance wealth amounts net of contributions at both the individual level and – under stylized family constellations – at the household level for the average contributor to the Austrian social insurance scheme for employees without civil service status.

And we have also made use of the household micro-data sample of the Austrian Household Finance and Consumption Survey (HFCS), for which we have calculated household contributions and net insurance wealth amounts. We have presented our results both together and in contrast with those for net household wealth in the conventional sense and with those of Knell and Koman (2022) for household pension insurance wealth and augmented household wealth.

Under our base case of a 3% discount rate, overall health and long-term care insurance wealth, net of social insurance contributions and self-payments, amounts to EUR 105,448 for the average active or retired employee of at least 16 years of age. EUR 71,892 or 68.2% thereof equals net compulsory health insurance wealth in the stricter sense, and EUR 29,650 or 28.1% long-term care insurance wealth. Only a modest EUR 3,905 (about 3.7%) are net *voluntary* health insurance wealth. The breakdown by gender yields overall average amounts of EUR 86,974 and EUR 124,441 for men and women, respectively.

When we aggregate to the household level, we can also observe a wide variety across household types; household insurance wealth increases significantly with the household size – couple households exceed single households, and households with children exceed those without children – as well as with the number of non-contributing household members, whether they are covered spouses or children.

In the sample of the Household Finance and Consumption Survey, household net compulsory health and long-term care insurance wealth amounts to EUR 238,353 on average. This figure is very close to EUR 250,272, the average amount of net household wealth in the conventional sense. And it also closely aligns with the average household's pension insurance wealth amount of EUR 245,051, as measured by Knell and Koman (2022).

Not only the amounts are impressive, but also the distributional impacts measured across the HFCS sample: The Gini coefficient, for example, for household insurance wealth amounts to 0.31, and at the aggregate wealth level, the augmentation of overall net wealth reduces the coefficient quite impressively from 0.73 to 0.47. This is again quite in line with the results of Knell and Koman (2022), according to which the Gini coefficients of household pension insurance wealth and augmented wealth amount to 0.45 and 0.53, respectively.

We admit that within our analyses there are still a number of areas open to improvement and further conceptual broadening. To mention a few notable areas of improvement: Our benefit data are specified only by age and gender – health an long-term care benefits received by the average Austrian of a particular age and gender. This is indeed rather general and unspecified, and should

only be considered a first step into this new field. Furthermore, the System of Health Accounts, our database on the benefit side, does not take into account certain income replacement benefits which are provided by social health insurance, most prominently sickness, maternity, and rehabilitation benefits. On the contribution side, we have not taken into account contributions from survivor benefits which will be newly derived from current active and retirement incomes in the further future; in the macro-data estimations we have also disregarded the existing stock of survivor benefits. Our net insurance wealth figures presented here only consider social insurance contributions as a source of finance. Almost one-quarter of health care benefits and even three-quarters of long-term care benefits are funded out of the general government budget and ultimately from general tax revenue, however. In our micro dataset, information on active incomes is only based on the snapshot given for the survey period and there is no information available on how incomes will evolve afterward. We assumed a general 1.3% productivity and real wage growth rate, but this certainly does not capture individual career steps und underestimates future contributions.

Conceptually, there are at least two more areas that need further attention. Underlying both health and long-term care as well as pension provisions is the concept of life cycle. This makes applying the normal inequality measures such as an unadjusted Gini coefficient doubtful. Assuming that all individuals have an identical income profile over their lifetime, save the same amount for retirement and retire and die at the same time, would result in a Gini coefficient of around 0.3. Hence, it seems necessary to apply an adjusted Gini coefficient for meaningfully measuring wealth inequality. Finally, we applied the period mortality and survival rates of the year 2017, where we also identify room for improvement: Cohort-specific as well as income-dependent mortality and survival rates could definitely offer additional and more detailed insights.

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8. Appendix

Table A1: Current expenditure on health care by functions and financing schemes in Austria, 2016 (in EUR million)

	Financing schemes	**HF.1**	HF.1.1	HF.1.2	**HF.2**	HF.2.1	HF.2.2	HF.2.3	**HF.3**	**HF.4**	**HF.1–4**
Health care functions		**Government and compulsory contributory health care financing schemes**	Government schemes	Compulsory contributory health insurance schemes (Social health insurance schemes)	**Voluntary health care payment schemes**	Voluntary health insurance schemes	Non-profit institutions financing schemes	Enterprise financing schemes	**Household out-of-pocket payment**	**Rest of the world financing schemes**	**Current expenditure on health care**
HC.1.1 + HC.2.1	Inpatient curative and rehabilitative care	10,574	4,855	5,719	1,084	885	199	0	500	0	12,159
HC.1.2 + HC.2.2	Day curative and rehabilitative care	342	183	159	0	0	0	0	1	0	343
HC.1.3 + HC.2.3	Outpatient curative and rehabilitative care	6,554	1,384	5,170	202	166	37	0	2,502	0	9,259
HC.1.4 + HC.2.4	Home-based curative and rehabilitative care	22	3	19	0	0	0	0	0	0	22
HC.3.1	Inpatient long-term care	1,647	1,647	0	0	0	0	0	1,119	0	2,766
HC.3.2	Day long-term care	42	42	0	0	0	0	0	0	0	42
HC.3.3	Outpatient long-term care	0	0	0	0	0	0	0	0	0	0
HC.3.4	Home-based long-term care	2,335	2,325	11	78	0	78	0	182	0	2,594
HC.1–3	**Personal health care services**	21,516	10,438	11,078	1,364	1,051	313	0	4,304	0	27,184
HC.4	Ancillary services	741	137	604	239	0	239	0	131	0	1,110
HC.5.1	Pharmaceuticals and other medical non-durable goods	2,993	0	2,993	31	31	0	0	1,389	0	4,413
HC.5.2	Therapeutic appliances and other medical goods	682	0	682	124	124	0	0	1,019	0	1,825
HC.1–5	**Personal health care services and goods**	25,931	10,575	15,357	1,759	1,207	552	0	6,843	0	34,533
HC.6	Preventive care	576	399	177	86	0	17	69	134	0	795
HC.7	Governance, and health system and financing administration	824	102	721	724	724	0	0	0	0	1,547
HC.9	Other health care services not elsewhere classified	0	0	0	0	0	0	0	0	0	0
HC.1–9	**Current expenditure on health care**	27,331	11,076	16,254	2,568	1,931	569	69	6,977	0	36,876

Source: Statistics Austria.

Table A2.1: Personal health expenditure by age and gender in Austria, 2016 (in EUR million)

		0	1–4	5–9	10–14	15–19	20–24
	Females						
HC.1.1 + HC.2.1	Inpatient curative and rehabilitative care	112	45	41	58	110	166
HC.1.2 + HC.2.2	Day curative and rehabilitative care	4	2	1	2	3	5
HC.1.3 + HC.2.3	Outpatient curative and rehabilitative care	27	121	192	178	175	205
HC.1.4 + HC.2.4	Home-based curative and rehabilitative care	0	0	0	0	0	0
HC.4	Ancillary services	1	5	5	6	11	15
HC.5.1	Pharmaceuticals and other medical non-durable goods	4	23	29	35	47	66
HC.5.2	Therapeutic appliances and other medical goods	2	10	14	17	17	19
HC.6	Preventive care	4	6	8	8	10	13
HC.1–2 + HC.4–6	**Total health expenditure**	**154**	**211**	**290**	**304**	**373**	**488**
	Males						
HC.1.1 + HC.2.1	Inpatient curative and rehabilitative care	140	62	60	61	103	123
HC.1.2 + HC.2.2	Day curative and rehabilitative care	5	2	2	2	3	3
HC.1.3 + HC.2.3	Outpatient curative and rehabilitative care	26	148	252	208	193	190
HC.1.4 + HC.2.4	Home-based curative and rehabilitative care	0	0	0	0	0	0
HC.4	Ancillary services	1	6	9	7	10	13
HC.5.1	Pharmaceuticals and other medical non-durable goods	5	30	36	43	51	63
HC.5.2	Therapeutic appliances and other medical goods	2	12	17	18	17	17
HC.6	Preventive care	5	7	10	9	10	11
HC.1–2 + HC.4–6	**Total health expenditure**	**183**	**268**	**385**	**349**	**388**	**420**

Table A2.2: Personal long-term care expenditure by age and gender in Austria, 2016 (in EUR million)

		0	1–4	5–9	10–14	15–19	20–24
	Females						
HC.3.1	Inpatient long-term care	0	0	0	0	1	3
HC.3.2	Day long-term care	0	0	0	0	0	0
HC.3.3	Outpatient long-term care	0	0	0	0	0	0
HC.3.4	Home-based long-term care	2	3	8	9	10	11
HC.3	**Total long-term care expenditure**	**2**	**3**	**8**	**10**	**11**	**13**
	Males						
HC.3.1	Inpatient long-term care	0	0	0	1	2	4
HC.3.2	Day long-term care	0	0	0	0	0	0
HC.3.3	Outpatient long-term care	0	0	0	0	0	0
HC.3.4	Home-based long-term care	2	4	12	14	14	15
HC.3	**Total long-term care expenditure**	**2**	**4**	**12**	**14**	**16**	**19**

Source: Statistics Austria, authors' calculations.

25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90+	Sum
262	307	251	253	339	447	473	465	583	655	725	517	407	259	6,472
7	8	7	6	9	11	11	12	15	17	21	15	12	7	177
252	288	260	281	384	436	392	323	361	330	348	213	155	116	5,040
0	0	0	0	0	0	0	0	1	1	2	2	3	3	14
20	22	23	26	37	47	47	44	50	51	67	52	47	37	613
89	105	110	125	168	202	206	195	215	207	235	152	117	67	2,397
23	27	28	33	50	67	76	77	93	94	115	82	72	56	971
18	21	19	20	27	33	33	30	36	37	41	28	22	15	428
671	**777**	**697**	**745**	**1,013**	**1,244**	**1,240**	**1,147**	**1,353**	**1,393**	**1,555**	**1,062**	**835**	**560**	**16,112**
140	147	160	215	324	458	525	515	624	629	674	384	249	93	5,686
4	4	4	5	8	12	15	15	19	19	21	12	7	3	166
215	216	199	218	295	327	321	298	286	275	296	136	96	24	4,218
0	0	0	0	0	0	0	1	1	1	1	1	1	1	9
14	15	16	19	27	39	43	42	50	48	60	36	27	13	497
84	102	100	106	137	180	181	170	190	172	181	100	63	22	2,016
19	21	23	29	44	67	79	81	96	92	102	58	40	18	855
13	14	14	16	23	30	32	31	35	34	36	20	13	5	367
489	**519**	**517**	**609**	**858**	**1,114**	**1,197**	**1,152**	**1,300**	**1,269**	**1,371**	**748**	**498**	**179**	**13,814**

25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90+	Sum
4	4	5	8	13	17	32	36	62	103	182	278	481	770	1,997
0	0	0	0	0	0	0	0	1	2	3	4	8	12	31
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	12	15	23	32	41	48	72	105	204	274	369	385	1,647
16	**16**	**16**	**23**	**36**	**50**	**73**	**84**	**135**	**209**	**389**	**557**	**857**	**1,167**	**3,675**
6	8	8	13	18	29	36	44	70	76	116	99	131	110	769
0	0	0	0	0	0	0	1	1	1	2	2	2	2	11
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	16	16	19	27	39	47	52	72	84	132	131	140	95	948
22	**24**	**24**	**32**	**45**	**69**	**83**	**96**	**143**	**161**	**250**	**231**	**273**	**207**	**1,728**

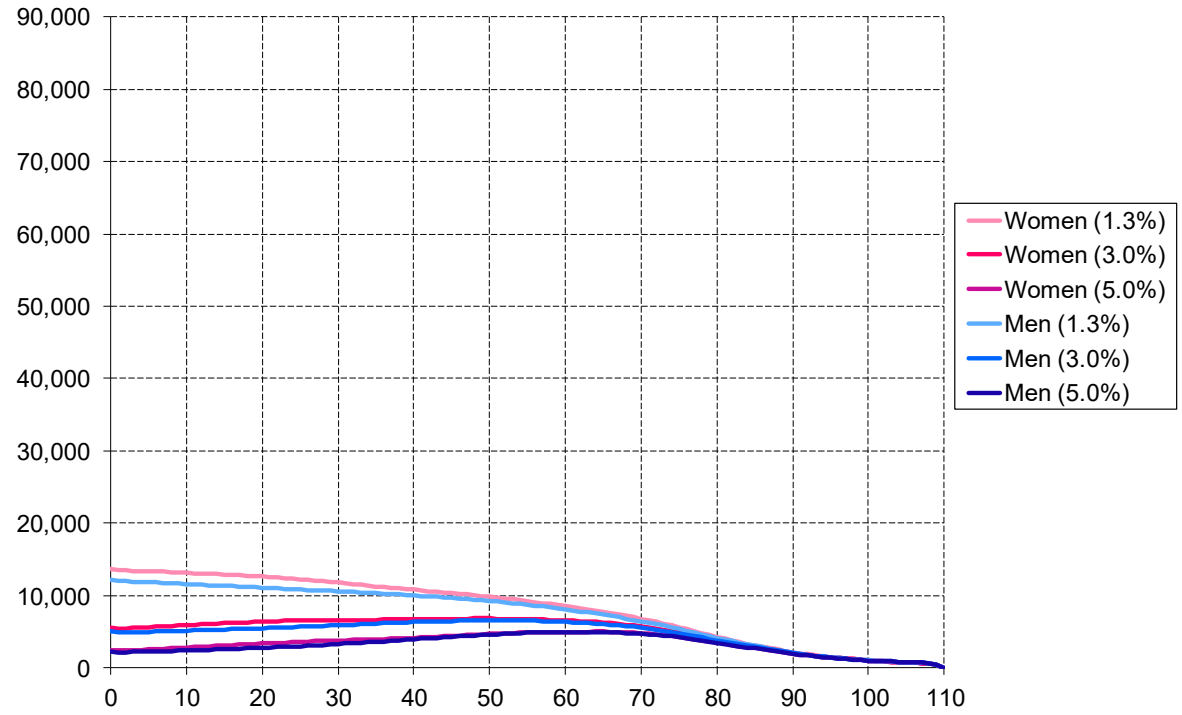

Figure A1: Gross voluntary health insurance wealth according to age (in EUR)

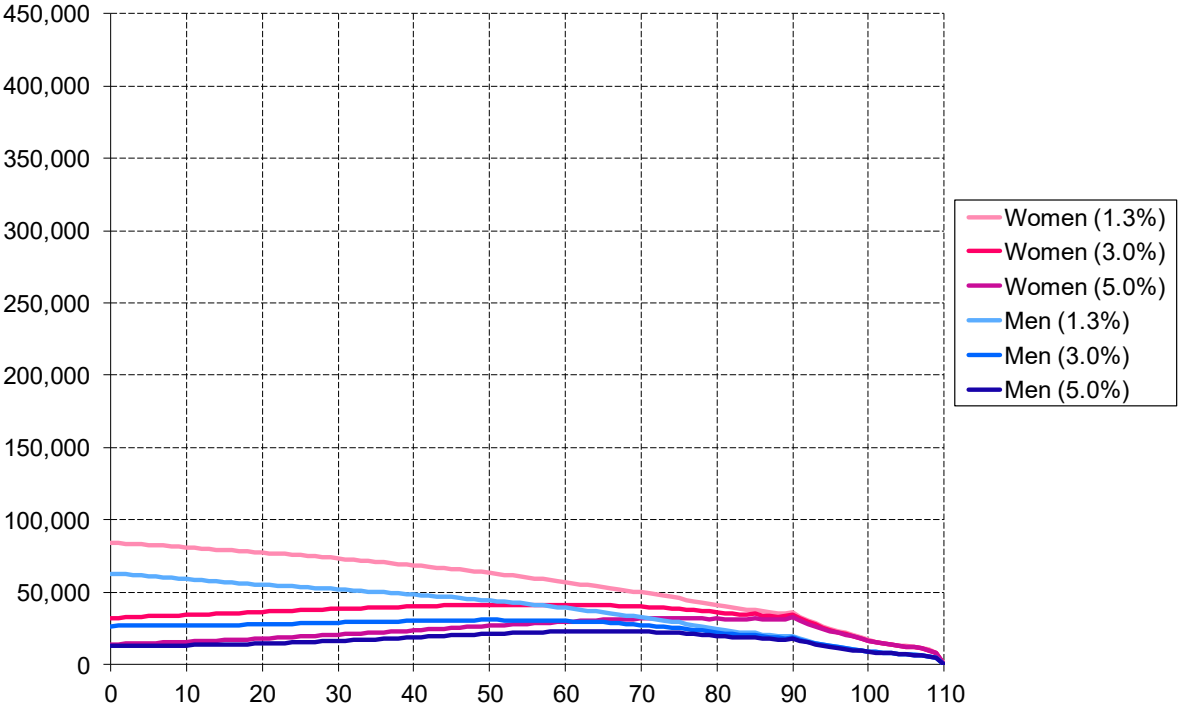

Figure A2: Present value of self-payments according to age (in EUR)

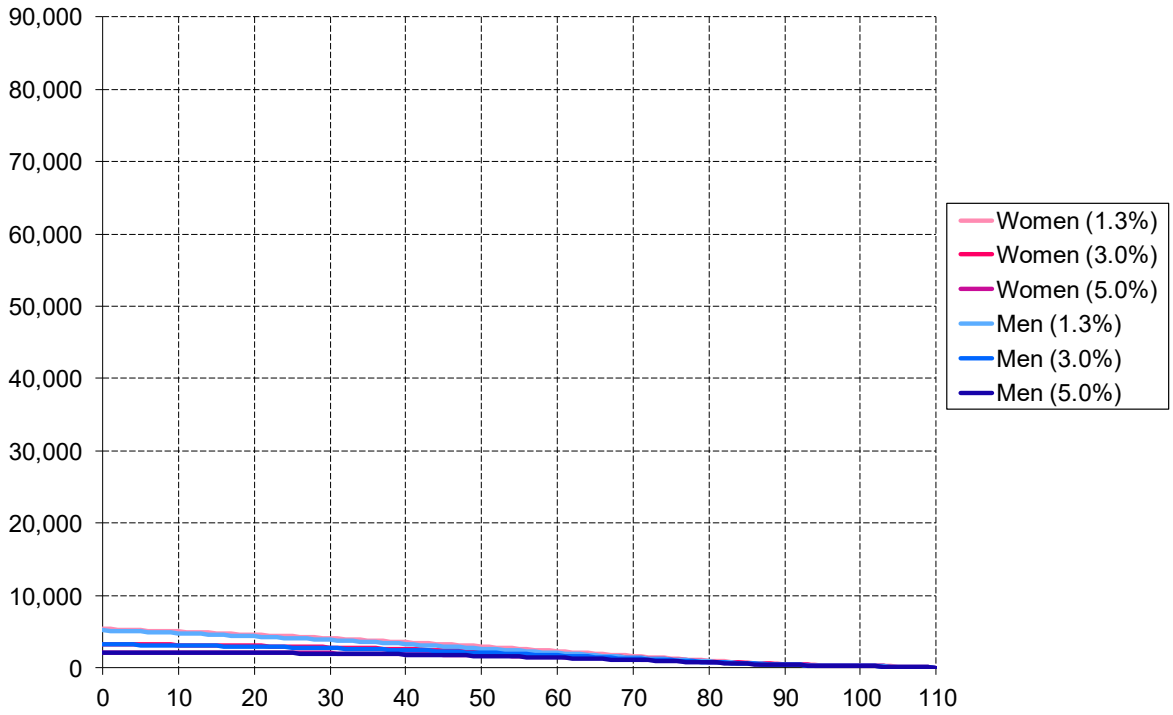

Figure A3: Present value of voluntary health insurance contributions according to age (in EUR)

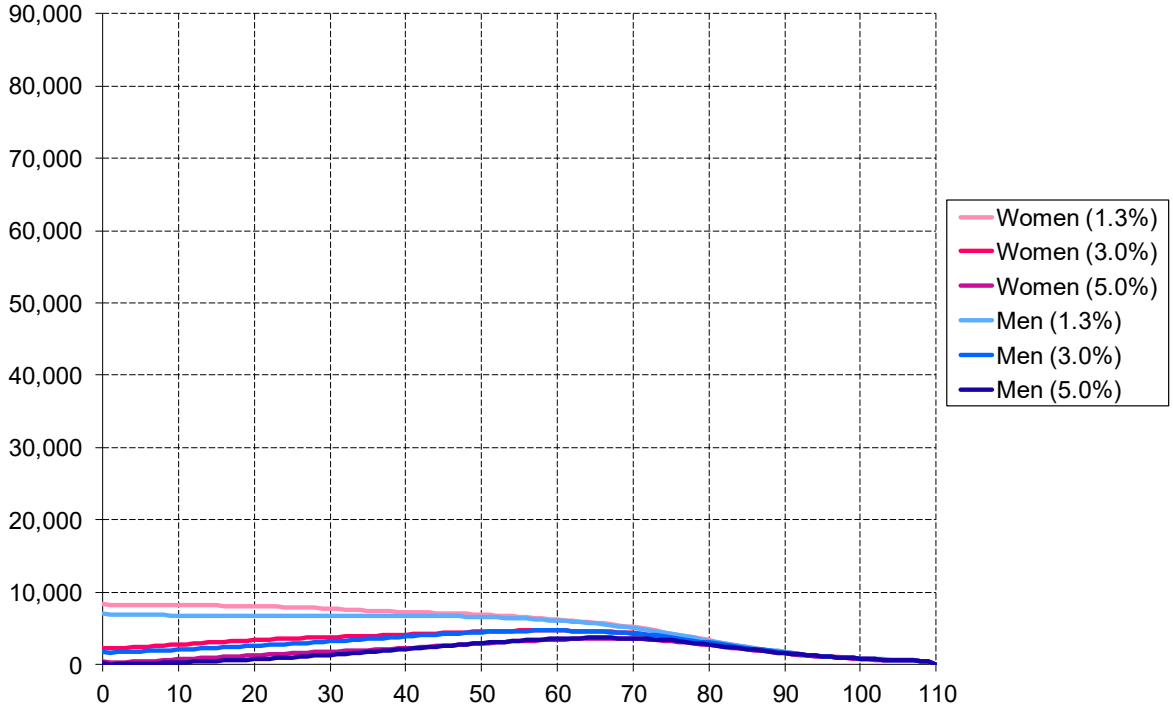

Figure A4: Net voluntary health insurance wealth according to age (in EUR)

Index of Working Papers:

February 28, 2024	Lukas Olbrich, Elisabeth Beckmann, Joseph W. Sakshaug	253	Multivariate assessment of interviewer-related errors in a cross-national economic survey
March 5, 2024	Nicolas Albacete, Pirmin Fessler, Atanas Pekanov	254	The Role of MPC Heterogeneity for Fiscal and Monetary Policy in the Euro Area
March 11, 2024	Martin Schneider	255	What contributes to consumer price inflation? A novel decomposition framework with an application to Austria
April 9, 2024	Konstantin M. Wacker	256	Investment incomes vs. the trade balance: Is the current account still a meaningful concept?
August 12, 2024	Michael Sigmund, Johannes Wächtler, Philip Schuster, Robert Ferstl, Maria Teresa Valderrama	257	Take it and leave it: Banks' balance sheet optimization and targeted longer-term refinancing operations
August 20, 2024	Maximilian Boeck, Alina Steshkova, Thomas O. Zörner	258	The Impact of Currency Carry Trade Activity on the Transmission of Monetary Policy
October 3, 2024	Tabea Bucher-Koenen, Pirmin Fessler, Maria Silgoner	259	Households' risk perceptions, overplacement, and financial literacy
December 4, 2024	Valentin Voith, Sandra Mauser	260	Making Sense of Financial Vulnerability: Between Sensitivity, Resilience, and Exposure
January 10, 2025	Alessandra Agati, Michael Sigmund	261	Banking in the Negative: A Vector Error Correction Analysis of Bank-Specific Lending and Deposit Rates
January 15, 2025	Christian Beer, Robert Ferstl, Bernhard Graf	262	Improving disaggregated short-term food inflation forecasts with webscraped data

January 17, 2025	Martin Cesnak, Andrej Cupak, Pirmin Fessler, Ján Klacso	263	Heterogeneous Impacts of Macroprudential Policies: Financial Advisors, Regulatory Caps, and Mortgage Risk
March 3, 2025	Marcel Barmeier	264	Targeted but (not) toxic? TLTRO and financial stability
March 20, 2025	Philippe Goulet Coulombe, Maximilian Göbel, Karin Klieber	265	Dual Interpretation of Machine Learning Forecasts
April 23, 2025	Reinhard Koman, Maria Hofmarcher, Robert Holzmann	266	Health and long-term care insurance wealth in Austria