

# Mandated annuities in Switzerland

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March 17, 2003

## Abstract

Switzerland is one of the few countries with a relatively mature funded pension scheme. This paper offers a short description of the Swiss system, highlighting two specific areas for which previous experience is particularly valuable. Taking the Swiss example, firstly, it illustrates the importance of prudential regulation and adequate transparency standards. Secondly, the paper explores the impact of different pay-out options in a mandatory second pillar.

## 1 Introduction

Probably the most important role annuities will play in the decades to come is within mandated fully funded pension schemes. Designing and regulating a so-called second pillar pension system is an ambitious task and requires careful evaluations of different policy options. As of today, only limited long-term experience on mandated fully funded pension plans is available. A notable and much cited example is Switzerland. Total accumulated capital stock amounted

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\*I am very grateful to Urs Birchler, Jürg Blum, Federica Teppa and the conference participants at Moncalieri for many valuable comments and interesting discussions. Olivia Popa provided very able and efficient research assistance. Most importantly I would like to thank CERP, especially Elsa Fornero and Silvia Maero, for their hospitality and support (which made it possible for me to attend the conference with a small baby). This work was supported in part by a grant from the Swiss National Science Foundation (grant No 1214-67875.02). Address: Monika Bütlér, DEEP-HEC, Université de Lausanne, BFSH1, CH-1015 Lausanne, Switzerland; email *Monika.Butler@HEC.unil.ch*, tel + 41 21 692 3484, fax + 41 21 692 3365.

to approximately 120% of GDP (see Figure 1) in 2000. Already today occupational pensions make up for approximately 40% percent of publicly provided or regulated transfer income during retirement. This percentage is anticipated to be higher for current contributors.

*Figure 1*

During the last 20 years Switzerland's first pillar AHV/AVS has suffered a substantial loss of reputation and public confidence due to ongoing and anticipated demographic changes and their impact on the financial viability of the plan. The second pillar, on the other hand, had been considered a safe and reliable provider of income in old age until very recently. Occupational pension plans had also played an important role in a traditionally tight labor market, with firms offering better pension plans attracting and keeping the better workers. Increases in life expectancy and the recent fall in stock market prices have turned the model pupil into the problem child of Swiss politics.

In this ongoing crisis, it turned out that forward-looking strategies of reserves management were rare at best. Few companies had accumulated enough reserves to cover the losses associated with a decrease in the market return. But the crisis is also a consequence of an inflexible regulation that is neither indexed to general economic conditions nor to demographic changes. The episode shows that it is inherently difficult to plan and regulate a system involving contracts spanning over several decades.

An area for which the Swiss second pillar provides valuable insights is the design of pay-out options. Mandated pension schemes are implemented primarily to prevent old-age poverty that may result from short-sighted planning or from the absence of adequate market saving instruments. From an economic efficiency point of view, this goal should be achieved without distorting optimal individual decisions too much. By law, Swiss second pillar annuities are joint annuities even for individuals without potential survivors. This may lead to a substantial redistribution from single to, on average more affluent, married beneficiaries. On the other hand, pension providers can (and often do) offer the option to withdraw the entire accumulated retirement assets as a lump sum. The combination of the two features is hardly optimal from both an equity and an efficiency perspective. The case of Switzerland thus shows that the design of pay-out options during the decumulation phase is of crucial importance in mandated annuity plans.

This paper provides a short overview of the Swiss pension system with a particular emphasis on the second pillar in section 2. The importance of prudential regulation and supervision is demonstrated in section 3 that describes the recent crisis of the Swiss second pillar in more details. Some illustrative evidence for the importance of pay-out options drawn from the Swiss case is provided in section 4. Section 5 concludes.

## 2 The Swiss old age insurance system

Switzerland has been the first OECD country that has mandated an occupational pension scheme as the second pillar to complement a pay-as-you-go (PAYG) system. The reliance on a multi-pillar approach has triggered considerable interest in the Swiss system. This section provides a short overview of the system, with an emphasis on the second pillar with its merits and problems.

### 2.1 The system in a nutshell

The core of Switzerland's pension system, also summarized in Table 1, is composed of three pillars, of which the first and second are of approximately equal importance. The first pillar AHV/AVS<sup>1</sup> is a predominantly PAYG system. It was introduced after a very successful referendum in 1948. The second pillar is a mandatory, employer-based, fully funded occupational pension scheme (as described in more details below). The so-called BVG/LPP<sup>2</sup> became mandatory in 1985, but had been a very important source of retirement for many Swiss employees long before the first pillar was set up. The first and second pillars are complemented by a voluntary third pillar of individual tax-favored saving for retirement.

*Table 1*

In 2000, on average, approximately 40% (50%) of publicly mandated retirement income were paid out by the second (first) pillar. This understates the importance of the occupational pension system, however, as contributing agents

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<sup>1</sup>AHV = Alters- und Hinterbliebenen-Versicherung; AVS = Assurance Vieillesse et Survivants.

<sup>2</sup>BVG = Bundesgesetz über die berufliche Alters-, Hinterlassenen- und Invalidenvorsorge, LPP = Loi fédérale sur la prévoyance professionnelle vieillesse, survivants et invalidité.

today can expect more than half of their combined first and second pillar income to come from the second. The third pillar predominantly covers self-employed workers, but is also used as a tax-saving device for upper middle and high income earners. The capital accumulated in the third pillar is almost always paid out as a lump sum due to the already high degree of annuitization by the first and second pillar.

## 2.2 The first pillar

The first pillar aims at providing a basic subsistence level of income to all retired residents in Switzerland. Its structure has changed considerably in 10 so-called revisions during the last 50 years. However, since a large increase in the size of the program in the late 60's and early 70's (in which period both payroll tax and pension benefits approximately doubled), the payroll tax rate has remained unchanged, and the ratio between average pension benefits and average per capita wages has remained almost constant.

The main features of the first pillar can be described as follows: Although there is a small trust fund, the public pension system is a pay-as-you-go system, in which the current young have to finance the pensions of the current old. The system is financed mainly with a proportional payroll tax on all labor income (i.e., without a cap), and an ear-marked fraction of the consumption tax (value added tax). By law, 20% of total expenditures have to be financed out of general federal government revenues. Pension benefits are paid out after the legal retirement age, regardless of whether the agent leaves the workforce or not.

There is a limited tax-benefit linkage in Switzerland, but the benefit scheme is relatively flat in reality. More important for the determination of future benefits is the number of contribution years including those granted for child care.<sup>3</sup> A majority of retirees qualify for a pension close or equal to the maximum benefit level. As in most other countries, the first pillar offers some explicit and implicit redistribution within and between generations and insurance against various contingencies.<sup>4</sup> Apart from the regular pension benefits, AHV/AVS also avails

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<sup>3</sup>The linkage between pre-retirement earnings and the benefit level has become considerably weaker in the last two decades. A large majority of (potential) beneficiaries with a full contribution period are entitled to maximum benefits, so that earnings history only matters for people with low average wages and/or contribution gaps. In 1998, for example, an average married couple received more than 92% of maximum benefits.

<sup>4</sup>See Büttler 2002 and Table 1 for more details.

means-tested supplemental benefits. The combination of a relatively flat benefit structure and supplementary benefits have led to a low poverty rate among the elderly in Switzerland,<sup>5</sup> although there are still gaps for low-income earners.

Recent and ongoing revisions of the first pillar have led to a number of important structural changes although the contribution rate and total expenditures have remained basically unchanged. First, family/household benefits have been replaced by individual benefits. Married couples' entitlements are capped at 150% of a single benefit. This reduction takes into account that per capita expenses are considerably lower in a two-person than in a single household. Married couples, on the other hand, benefit from AHV/AVS's survivor insurance (in favor of widows only!) during the working period. The redistribution between single and married individuals is thus small. Second, individuals with responsibilities for children up to 16 years or other dependants are now entitled to (child-)care credits. Third, contributions during marriage, including child-care credits, are split between the spouses. This change led to a substantial improvement for divorced women, but reduced the entitlements of couples with a non-working spouse and few or no children. Fourth, the legal retirement age for women will be raised stepwise from 62 to 64 years, and most probably to 65.

For a very long time, the first pillar has been viewed as very stable, efficient (at reducing poverty in old age) and cheap (due to very low administration costs of  $\approx 1/3\%$  of benefits). But as most PAYG systems in Europe, the Swiss first pillar is plagued by unfavorable demographics due to lower mortality and fertility rates which have led to a strong increase in the old-age dependency ratio.<sup>6</sup> If current levels of contributions and benefits are left unchanged, the present value of future contributions falls short of the present value of future claims by about a third. There are virtually no reserves — the AHV/AVS trust-fund makes up for less than one year's worth of benefits — to cushion the anticipated population aging. There is no consensus in current political debate as to how to fix the financing problem apart from an increase in the earmarked VAT. It is important to note

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<sup>5</sup>The last comprehensive poverty study in Switzerland dates back to 1992 (Leu, Burri & Priester (1997)). It reports a poverty rate of 5.6% for the whole population, and of only 3.6% for people beyond the legal retirement age. Recent numbers suggest that the general picture has remained unchanged.

<sup>6</sup>Foreign immigrants, which make up approximately 20% of the work force, are net contributors at present. An increase in immigration is not really considered an option due to political resistance and the fact that the fertility rate of second generation immigrants is very close to the one of Swiss citizens.

that policy makers face strong political constraints for potential reforms. Any change of the law can be (and usually is) challenged by an optional referendum. The public thus possesses veto power for all reform of the current social security system. This is crucial as the median voter, who is approximately 48 today, is anticipated to have an age of 52 by the year 2020.

The retirement age observed in reality is below the statutory retirement age albeit to a somewhat lesser degree than in other European countries. According to a recent SAKE/ESPA study,<sup>7</sup> a majority of Swiss men (53%) and 44% of Swiss women retire before legal retirement age of 65 for men or 62 for women. The outcome is striking in view of the fact that the first pillar does not yet offer early retirement. Many of those (predominantly middle and high income) beneficiaries have received generous early retirement packages from their occupational pension provider, often with additional benefits until age 65/62 to bridge the time to the legal retirement age. Figure 2 shows the distribution of retirement ages collected from 10 Swiss occupational pension funds. The data exhibit a wide variety of retirement ages, with a triple-peak profile for men and a double-peak profile for women at ages 60, 62, and (for men only) 65. The peaks at 60 and 62 correspond to the lowest age for which early retirement packages are offered at relatively favorable conditions in occupational pension funds.

*Figure 2*

### **2.3 The second pillar: Occupational pension plans**

The Swiss second pillar, after a long history as a private occupational pension system became mandatory in 1985. As Figure 3 shows, a sizeable fraction of the working force had been covered already before such plans were mandated by law. Although Figure 3 overstates the true coverage rate due to some double-counting, the numbers convey a relatively high coverage especially for male workers.

The second pillar's main goal is to maintain the pre-retirement living standard together with the benefits stemming from the first pillar. Apart from retirement income, the second pillar also provides insurance for disability and survivors of insured men (but not of women) during the accumulation period. A detailed description of all aspects of the second pillar is thus beyond the scope of this paper.

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<sup>7</sup>SAKE / ESPA is a longitudinal (rolling panel) study of the Swiss labor market, but also covers individuals beyond the retirement age.

The interested reader is referred to Queissar & Vittas (2000, especially concerning institutional details) and the official publications of the Swiss *Bundesamt für Statistik* (2002).

*Figure 3*

### 2.3.1 Organization and financing

Occupational pension plans are organized, in general, by the employer. The employer can choose several forms of organization, the two polar cases being an autonomous pension fund, on the one hand, and a contract with an insurer, on the other hand. As a consequence (and also for historical reasons), the system is very segmented. There are more than 10'000 funds, though this number is decreasing rapidly. When occupational pension plans were mandated, all schemes had to be defined benefits (DB). By now, and after an early change in the law, more than 75% are defined contributions (DC). Administration costs are low for international standards, approximately 8% of benefits, but high compared to AHV/AVS.

The second pillar is designed to be integrated with the first pillar. As the latter provides a basic level of income, the BVG/LPP only insures income above a certain threshold level, the so-called coordination offset which is equal to a yearly maximum single AHV/AVS pension (in 2003: 25'320 CHF  $\approx$  17'000 EURO  $\approx$  18'500 USD). There is, in principle, also a maximum insured earning which is equal to three times the maximum single AHV/AVS benefit. Pension providers are free to offer insurance for income below or above the two threshold levels. While most do for income greater than the maximum — many companies do not even have an upper level — very few do for income below the threshold level. This lower threshold explains the much lower coverage for female workers (Figure 3), who often work part-time and have lower average wages than men.

Contributions are a certain percentage of coordinated (= insured) salary of which the employer has to pay at least half. The law also mandates minimum contribution rates, which increase considerably with age (from 7% at age 25 to 18% from age 55 onwards), but leaves the details to the individual pension providers. These so-called age retirement credits are accumulated as retirement assets and bear an interest rate. The Swiss Federal Council determines the (nominal!) minimum rate of return. This minimum rate requirement remained at 4% for 17 years (from 1985 to the end of 2002, 3.25% since 2003), despite the fact that market returns showed considerable variability and exceeded this 4% level by a

large margin most of the time. As will be shown below in section 3 this feature of the Swiss system was at the root of the recent pension crisis.

The accrued capital is fully portable (with minor deductions especially for short employment spells) when the insured individual changes the employer. By law, an employee changing the firm gets the accumulated total contributions accrued at the minimum interest rate. The law is silent as to how accumulated reserves have to be distributed. In practice this meant that job changers got less than their fair share during the high return episodes. This feature was considered an important obstacle to mobility on the Swiss labor market in the 1990s. At the present low market returns and wide-spread underfunding of pension providers, on the other hand, the requirement could potentially induce employees to flee an underfunded pension provider, i.e., an employer attached to such a provider.

### 2.3.2 Insured benefits

Upon attainment of retirement age, the accumulated capital can be withdrawn either as a monthly life-long annuity or as a lump sum provided the pension fund allows for this option.<sup>8</sup> Old age pension benefits are strictly proportional to the accumulated retirement assets (retirement credits plus accrued interest). The accumulated capital  $K$  is translated into a yearly pension  $B$  using the conversion factor  $\gamma$ :

$$B = \gamma K.$$

This conversion also applies to DB plans; the fund has to make sure that enough capital is accumulated to cover the claims made based on previous income. Benefits are fixed annuities in principle, but the law states that pension providers have to adjust current old age benefits to inflation within the scope of their financial possibilities.

The conversion factor presently amounts to 7.2% and is determined by the Swiss Federal Council. This number was constructed using a (technical) interest rate of 4% (the legal minimum requirement for 17 years) and somewhat optimistic — from the pension provider’s perspective — mortality tables. As Table 2 demonstrates — using most recent mortality tables —, this factor together with a market interest rate of 4% delivers an average money’s worth ratio (MWR) close to one. With this presently unrealistically high discount factor, there is no

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<sup>8</sup>Focusing on annuities I again abstract from benefits (disability/survivor) during the accumulation period.

room for increases (e.g., inflation adjustments) in the yearly benefit for already retired individuals. It is thus not surprising that the private market for annuities in Switzerland is relatively thin. Private insurers are simply unable to offer the same deal to their customers, especially if they are bound to face adverse selection due to information asymmetries with respect to mortality rates.

The BVG/LPP mandates joint annuities; the conversion factor is the same for everybody irrespective of gender, family status or income. Children under age 18 (or under age 25 if still dependent) of retired persons get an additional pension of 20% of the main claimant's benefit. When a retired man dies, his widow receives a benefit amounting to 60% of the previous pension, his dependent children a benefit of 20% each. As obvious from Table 2 this leads to sizeable differences in the MWR, as will be explained in more details in section 4 below.

*Table 2*

When given the choice between an annuity and a lump sum,<sup>9</sup> most individuals choose the former although lump sum withdrawals enjoy a preferential tax treatment — the present value of taxes can be up to three times higher with the annuity, depending on the canton of residence. This is presumably also a consequence of the very high MWR offered by the second pillar.

### **2.3.3 Regulation and supervision**

The Swiss second pillar is heavily regulated in both the accumulation and the decumulation phase. Apart from the above mentioned requirements concerning the minimum rate, the contribution rates and the survivor benefits, the BVG/LPP and its amendments also put limits on possible asset structures. These limits on investment, which are also a function of a fund's asset & liability structure, have been relaxed considerably, however, so that they hardly ever bind in practice.

In the pay-out phase, the pension fund's hands are tied as well. The conversion factor can only be relaxed in extraordinary circumstances and in general only for the part exceeding the upper coordination limit. Pensions of current retired beneficiaries cannot be reduced unless the law is changed. While this constraint provides a high degree of security in old age, the grandfathering of existing pensioners potentially goes at the expense of future generations as will be argued below.

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<sup>9</sup>See also section 4 for more details.

Most importantly, by law, *the pension provider must guarantee that it can fulfill its obligations at all times*. The law states that the pension institution must regulate its systems for contributions and funding in such a way that the benefits can be paid when due, but does not specify more precise requirements.

Other aspects of regulation concern the organization and the administration of the pension fund, impose accounting standards and specify audit requirements.

Supervision of occupational pension institutions is overseen by the Swiss Federal Council. Pension institutions without national or international importance are supervised by cantonal supervisory authorities.<sup>10</sup> The Federal Office for Social Insurance supervises the cantonal supervisory authorities as well as pension providers with national or international importance. The different layers and the large segmentation of the supervisory authority potentially reduce the quality and transparency of supervision.

The Federal Office for Social Insurance is also in charge of the so-called Suppletory Institution,<sup>11</sup> and even more importantly, of the BVG/LPP *Security Fund*. The Security Fund's most important task is to act as a reinsurance institution, i.e., to secure benefits in accordance with the rules for the beneficiaries of insolvent pension providers. In contrast to what may be expected of such an institution, the fund does not primarily accumulate reserves,<sup>12</sup> but is financed on a pay-as-you-go base, with a contribution rate of 0.1% of the coordinated earnings at present. To cover its obligations in bad times the Security Fund will have to increase the contribution rate when the individual funds face greater difficulties financing their primary obligations. Given that occupational pensions are mandated by law, an important question is whether the government has the moral obligations to guarantee the benefits when the Security Fund is unable to do so. Another question is whether an employer can afford to let his fund go bust.

Up to now, little emphasis has been placed on transparency. The pension providers have to inform the insured about their anticipated benefits in old age or when disabled, but do not have to inform them about their financial situation. The lack of transparency has two important aspects. First, the insurance compa-

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<sup>10</sup>The 26 cantons are the Swiss states. They enjoy a considerable independence from the confederation in many important areas such as tax setting, schooling, and regulation.

<sup>11</sup>The Suppletory Institution covers voluntary insured individuals as well as employees if the employer has not affiliated with an occupational pension provider despite legal provisions.

<sup>12</sup>In the past, its reserves have always been less than 1/10 of the total accumulated retirement assets in Switzerland, and were even negative at times.

nies may be insufficiently supervised and may decide on investment/contribution strategies that are detrimental to the interest of the insured worker. Second, individuals that are not aware of potential financial shortfalls of their fund, may find out only at a time when they do not have much time left to make up for the losses.

### 2.3.4 A short appraisal of the system

The long history of the scheme is reflected in the large capital stock accumulated to date. As a percentage of GDP the capital stock amounts to approximately 120% of GDP. Although coverage is restricted, the second pillar insures a relatively high percentage of the labor force.

In contrast to the first pillar, the BVG/LPP is based on outdated models of the labor market and the family structure. The coordination offset is not reduced for part-time employment. Widowers can usually not claim a benefit after the death of an insured married female individual even when the wife had been the main bread winner of the family. The structure of the BVG/LPP thus has an important catch. When Queissar and Vittas (2000) conclude that the second pillar is “remarkably well integrated” with the first, this is again only true for a male married single earner. The system does not take account of the many cohabiting unmarried parents with children, part-time workers or job-sharers as well as homosexual couples, who all get a much lower degree of insurance for their contributions than married men.

Money’s worth ratios of the Swiss occupational pension system are very high except for single men.<sup>13</sup> A constant discount factor of 4% — this corresponds to the minimum rate requirement — together with a non-increasing pension delivers an average MWR only marginally smaller than one. If one adds a moderate growth of pension benefits of one percent annually, the MWR is already close to 1.1. Taking the term structure of interest rates reported in James & Song (2001),<sup>14</sup> the picture looks even more favorable for the pensioners — and worse for the insurers.

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<sup>13</sup>This fact has already been pointed out by other authors. See, for example, James & Song (2001) and Davies (2003).

<sup>14</sup>James & Song (2001) argue that the used term structure of interest rates is probably too conservative, i.e. too low. But Swiss real interest rates have traditionally been considerably below European and US real interest rate (the difference is of the order of 1.5%), discounting interest rates below 4% seem very plausible).

As will be argued below in section 3, overly generous pension and survivor benefits together with opaque rules of regulation and supervision has put a serious threat to the second pillar.

### **3 The recent (and ongoing) Swiss pension crisis**

The Swiss pension system has had a long successful history and has enjoyed considerable international praise from both an academic as a political side. Fundamental changes to the system have been rare and contributions and replacement rates have basically stayed constant for many decades. Consequently the public awareness of potential shortcomings of the fully funded part was weak at best, reinforced by the fact that little emphasis had been put on sufficient information and transparency.

#### **3.1 An overview of the crisis**

Market returns on both the bond and stock market had been markedly above the minimum rate of 4% during the early and mid nineties. Average bond and stock returns from 1990 to the end of 2001 amounted to 5.5% and 12%, respectively (see Figure 4). In 2002, however, Swiss pension providers suffered a loss of approximately 10% on average. But even when one includes the recent downturn of the stock market, the average return on stocks since 1990 were still 8.4% to the end of 2002.

*Figure 4*

“Excess returns” in good times were often spent on adjusting pension benefits not only to inflation but also to wage growth or on financing generous early retirement packages. Another way to distribute high returns was a reduction of contribution rates. Many pension funds did not even collect contributions for some period of time or reimbursed employees and employer at the end of the year. Recommendations to accumulate higher reserves for rainy days were left as unheard as claims to adjust the minimum rate to the high market returns. The few advocates of prudential reserve management were not really taken seriously.

The public woke when the problem ridden airline company Swissair announced that it reclaimed several millions Swiss francs of paid contributions out of the

fund. The former CEO of SAir group argued that “two thirds of the contributions are paid by the employer. Thus also a part of the fund’s reserves belongs to the employer”.<sup>15</sup> The justification of this claim was that reserves do not belong to the fund, but to the contributors, i.e., the employees and the employer. In fact Swissair’s claim was nothing more than what had been considered common practice during the nineties. But by then financial prospects were less favorable (the market return had already started to fall), and — more importantly for the public perception — it involved a firm with huge financial difficulties.

In March 2000, the Swiss Federal Council announced that the pension funds would need more resources to fulfil the future pension requirements. However, this need was motivated rather by realized and projected increases in longevity than by lower returns. In fact, the Swiss Federal Council suggested a reduction in the conversion factor or an increase in the minimum rate from 4 to 4.8%, but realized that the latter might not be feasible and might lead to a deterioration of the financial situation of many pension funds. The reduction in the conversion factor, moreover, was scheduled to be implemented in little steps over a 20 years period.

Since 2000, the situation has changed dramatically. Mainly as a consequence of the stock market downturn, market returns had fallen below the 4% minimum return requirement. The average degree of funding obligations of pension providers has decreased to approximately 90% with the market return and has led to an underfunding of many pension funds. Mid 2002 and under the guidance of the company Swiss Life (Rentenanstalt), the life insurers (which predominantly organize pension plans for smaller and medium enterprises) requested a reduction of the minimum return to 3% or less. After what was publicly perceived to be an unprecedented lobbying act of the life insurers, the Swiss Federal Council conceded to this request and announced to it would reduce the minimum return requirement to 3.25% as of January 1, 2003.

This announcement caused a public outcry that went far beyond the usual level of indignation in Switzerland. Life insurers were accused of attempted “theft” of pension benefits (*Rentenklau*). Observers attributed the strong reaction not primarily to a lack of comprehension for the measure taken, but to other factors. One factor were scandals that concerned two well known pension

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<sup>15</sup>The citation (originally in German) is taken from the weakly Swiss journal *Cash* (March 5, 2000): “Zwei Drittel der Beiträge stammen von den Arbeitgebern. Demzufolge gehören auch die Reserven zu einem Teil dem Arbeitgeber.”

providers.<sup>16</sup> The more important reason, however, was an almost complete absence of transparency and the fact that potentially huge profits during the 90s that should have been used to accumulate reserves seemed to have disappeared. As Figure 4 demonstrates it would have been easy for pension companies to cushion a fall in the market interest rate — at least for a certain time.<sup>17</sup>

The debate is going on. A minimum rate equal or slightly below the market return guarantees that the pension provider can accumulate retirement assets at the rate mandated by the law. But not only the accumulation, but also the decumulation phase is affected by a change in the prevailing market return. Regardless of any minimum rate requirements, the market cannot always generate a return on accumulated retirement assets that would be necessary to maintain the mandated pension benefits from a given capital stock, especially as Swiss MWRs are very high. A lower minimum rate thus only solves part of the financial problem in low return periods as will be argued below.

A further reduction of the minimum return below the 3.25% as well as a reduction of the conversion factor, and possibly even of benefits of already retired individuals are still open issues. Politically a reduction in the conversion factor (and even more so of current pension benefits) seems difficult to achieve, however. Contributors and current pensioners are not willing to bring what is generally perceived as yet another sacrifice.

### **3.2 Minimum rate requirement and the conversion factor: A simple analysis**

The market return has two major implications for a fully funded pension plan. Firstly, the higher the return the faster the retirement capital will accumulate, and a lower contribution rate is needed to achieve a certain capital stock at retirement. Secondly, the higher the return, the higher the annuity that can be paid out from a given level of retirement assets. This section provides a simple

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<sup>16</sup>Top managers of a big life insurer were reported to have borrowed large amounts of company money at very favorable conditions to invest in an investment fund resulting in large purely private profits. Two former CEOs of an international firm allegedly used the company's pension fund to process huge golden parachute payments in order to benefit from a very favorable tax treatment.

<sup>17</sup>This, of course, does not apply to pension providers entering the market (or new plans offered) after mid 2000. This fact had been used as an argument in favor of a decrease in the minimum rate.

formal analysis of how a permanent reduction in the market return affects MWRs for different generations under the current Swiss regulatory setup. Recall that the minimum rate at which pension providers have to accumulate retirement is fixed by law, and that retirement benefits are a fixed fraction (the conversion factor) of accumulated retirement assets upon retirement.

To simplify the analysis, I assume that the fall in the interest rate is permanent and that the conversion factor and current pension benefits are left unchanged.<sup>18</sup> I also assume that the previous market interest rate had been equal to the minimum return of 4%, and that the new market interest rate is 3%. Contributions are assumed to grow at 2% annually accounting for wage growth and increasing contribution rates with age.

Figure 5 shows the MWRs for an “average” individual over the life-cycle for various combinations of market and mandated interest rates.<sup>19</sup> The MWRs reported For younger individuals the numbers reported in Figure 5 are MWR for deferred annuities, with the pay-out period starting at age 62. When the market interest rate is equal to the minimum rate of 4%, the MWR is equal to one for all ages, and the pension providers break even in the absence of administration costs.

Let us now consider a permanent fall in the market interest rate to 3%. Taking this value to discount pension payments and retirement credits, Figure 5 reveals that the resulting MWR is considerably above one, as the present value of future pension benefits exceeds the capital at retirement by approximately 10%. If the minimum rate stays above the market rate (solid line and stars in Figure 5), this effect is reinforced by the fact that pension providers have to credit a higher interest rate than the market interest rate during the contribution period. This would lead to an insolvency of the pension provider sooner or later even in the presence of reserves.

But even if the minimum rate is reduced to the new market return (dashed line in Figure 5), MWRs exceed one for all ages. The reason is that the present value of pension benefits at retirement is considerably above the capital stock (on which the benefits are based) at retirement. Thus if retirement benefits are to be

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<sup>18</sup>As argued above, a reduction in the conversion factor is more difficult politically than a reduction in the minimum return as it affects vested claims more directly.

<sup>19</sup>To do this, I pooled mortality and survival rates for male/female and married/single individuals. As the resulting MWR for a market interest rate equal to a mandated interest rate of 4% is very close to 1, the numbers in Figure 5 are normalized to one for this scenario.

left untouched, the pension providers need an additional margin to finance their liabilities.

If the conversion factor cannot be adjusted, the solvency of the pension fund can only be restored by an interest rate on retirement credits considerably below the market interest rate. A fraction of the potential return on the working generation's capital stock will then be diverted to finance the claims of the retired individuals. A sufficient funding can, therefore, only be achieved with a sizeable redistribution between living generations as is reflected in Figure 5. The effect on the MWRs is largest for middle-aged individuals. These contributors see their already accumulated pension capital and their retirement credits grow at too low a rate. The accumulation deficit due to the foregone return on accumulated retirement credits exceeds the potential benefit of too high a conversion factor upon retirement for the current middle-aged. For younger individuals the trade-off is more favorable as contributions are concentrated towards the end of working life. As a consequence, the present value of the accumulation deficit due to too low a return on retirement credits is smaller for them. The closer to retirement age, on the other hand, the more important in present value terms is the favorable conversion between accumulated retirement credits and pension benefits.

*Figure 5*

### **3.3 Preliminary lessons from the crisis**

Fluctuations in the market return are one of the main challenges pension providers and regulators face. There are two polar ways to deal with these fluctuations from an ex ante perspective. The first would be to let individuals bear the market risk, leading to a relatively transparent pension environment, but jeopardizing the goal of providing sufficient insurance in old age. The second would be to aim at a stable contribution/benefit regime, transferring investment risks to pension providers and across generations (as well as potentially the government as a reinsurer of last resort). If the emphasis is on stability of acquired claims at least to a certain degree, fluctuation reserves must be sheltered from political pressure. The fundamental trade-off the regulatory authority has to take a stand on is thus between flexibility and insurance of pension claims.

The Swiss second pillar has relied greatly on a stability of acquired claims, requiring a minimum return which seemed realistic at least in the medium run.

In retrospect, the financial problems of many Swiss pension providers could have been avoided at least temporarily by an accumulation of sufficient reserves. But the system left the management of “excess returns” basically at the discretion of pension providers, while no real precautions were prescribed for the downside risk. The requirement to accumulate enough reserves remained opaque. Many pension providers failed to accumulate enough reserves to cushion fluctuations in the market return on their own account, while the regulatory authority remained silent.

The definition of property rights in the Swiss second pillar has been fuzzy; the link between residual control rights and residual claims is very weak. The Swiss basically have relied on the political process as a complement to incomplete contracts. But as the experience has demonstrated, discretionary policy changes can lead to a piecemeal regulation that may be detrimental to both the efficiency and the viability of the system. A lesson that can be drawn from the recent crisis is that transparent adjustment rules should avail for potential crisis. Under pressure, it is more difficult to recognize that various components of the regulatory setup — such as the conversion factor and the minimum rate requirement in the Swiss case — are affected by the same underlying market forces. Most likely, crisis management under time pressure also leads to a one-sided distribution of the rescue burden at the expense of certain groups of insured individuals.

Even if the system emphasizes insurance of pension claims, regulation should be able to account of *permanent* changes in the underlying parameters, notably the market returns (aging of baby-boomers) and changes in mortality rates. In the long run, the very high MWRs the Swiss system currently offers will not be sustainable as the financial margin for pension providers is simply too small.

Inadequate regulation and supervision is often closely related to insufficient transparency. Given that it is inherently difficult to assess the financial situation of a fund even for experts, the regulators should aim at the highest degree of transparency possible. It seems as if — in the absence of sufficient information — Swiss insured individuals have trusted the regulatory setup and have not found it worth the effort to acquire additional information. Information asymmetry is thus somewhat endogenous.

The Swiss episode also highlights political economy considerations of pension fund regulation. The first is an important asymmetry in the political process if adjustments are not rule-based. Claims to increase the minimum return during high return episodes had been ignored while the fall in the market rate led to a

(for Swiss standards) almost immediate adjustment. The second consideration is that long term planning (and regulation) are difficult in the presence of political pressure to increase benefits when capital reserves are high.

## 4 The design of pay-out options

The design of pay-out options as well as the degree of flexibility offered to pensioners in a fully funded pension system are crucial questions policy makers face. The two most important pay-out options in a fully funded pension plan are usually the choice between a lump sum and an annuity, as well as the choice between single and joint annuities. Many Swiss pension plans (notably a majority of DC plans) offer at least a partial choice between a lump sum and an annuity. Provided the individual chooses to annuitize upon retirement, however, there is no choice in Switzerland; the benefit comes in the form of a joint-and survivor annuity without a compensating increase in benefits for those without potential eligible survivors. Below, I will explore these two features of the Swiss system in turn.

### 4.1 Joint annuities — but not for all

The Swiss second pillar insists on joint-and survivor annuities *for married men*, but *not for women* or non-married couples. Given a certain capital stock upon retirement, the resulting pension benefit is independent on gender, marital status or the age difference between eligible spouses. Thus single individuals and married women do not get higher benefits to compensate for the absence of eligible survivors.<sup>20</sup>

The most popular rationale for joint annuities is to prevent poverty among elderly widows. On the other hand, the prevalence of joint annuities even before the second pillar became mandatory in Switzerland hints at the fact that the “normal” insured worker had been male and married until well into the seventies. Legislation in 1985 just continued what had been common practice before although the situation had already started to change by then. At present, the

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<sup>20</sup>As mentioned above, the second pillar also pays out benefits to widows and (semi-)orphans before the insured individual reaches the retirement age. This section abstracts from this possibility. It is important to mention, however, that survivor benefits before retirement increase the intragenerational distribution in favor of married men.

single earner model is no more valid for a majority of Swiss families, with the divorce rate climbing to more than 40% and Switzerland having a relatively high female labor market participation.

To investigate the impact of this joint–annuity requirement I have computed money’s worth ratios as a function of gender, marital status and the age difference between spouses based on the most recent population mortality tables. Survival probabilities depend on gender and marital status, and the joint probability of survival is obviously a function of the age difference  $d$  between the spouses. For expositional reasons, both the discount rate  $\rho$  and the yearly increase in the benefit level  $g$  are assumed constant.

For a married individual with an eligible spouse, the present value (PV) of all future benefits from retirement age on can be written as

$$\text{PV} = \sum_{t=J}^{\infty} \left( \frac{1+g}{1+\rho} \right)^{t-J} B \times \begin{cases} \text{Pr}[M \text{ alive}, S \text{ alive}](t) \\ + \text{Pr}[M \text{ alive}, S \text{ dead}](t) \\ + \text{Pr}[M \text{ dead}, S \text{ alive}](t) \times \lambda \end{cases}$$

where  $\text{Pr}[\cdot, \cdot](t)$  denotes the probability of a benefit inducing marital status at age  $t$ , conditional on the main claimant being alive and married at age  $J$ .<sup>21</sup> The parameter  $\lambda$  denotes the fraction of the main claimant’s pension the surviving spouse gets after the death of the former. For non–married individuals the computation is similar.

As the yearly benefit is  $B = \gamma K$  the money’s worth ratio (which is equal to  $\text{PV}/K$  is simply

$$\text{MWR} = \gamma \times \sum_{t=J}^{\infty} \left( \frac{1+g}{1+\rho} \right)^{t-J} \begin{cases} \text{Pr}[M \text{ alive}, S \text{ alive}](t) \\ + \text{Pr}[M \text{ alive}, S \text{ dead}](t) \\ + \text{Pr}[M \text{ dead}, S \text{ alive}](t) \times \lambda. \end{cases}$$

The resulting MWRs are reported in Table 2 and Figure 6. For married individuals in Table 2 it is assumed that the wife is three years younger than the husband as is approximately the case in reality. As mortality differences between single, widowed and divorced agents above age 65 are very similar, MWRs are only reported for single men and women in Table 2. I have also abstracted from the (very small) probability of (re)marriage after age 65.

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<sup>21</sup>This implies that  $\text{Pr}[M \text{ alive}, S \text{ alive}](J) = 1$ , and that for any  $t \geq J$ ,  $\text{Pr}[M \text{ alive}, S \text{ alive}](t) + \text{Pr}[M \text{ alive}, S \text{ dead}](t) + \text{Pr}[M \text{ dead}, S \text{ alive}](t) + \text{Pr}[M \text{ dead}, S \text{ dead}](t) = 1$ .

*Figure 6*

As is obvious from Table 2, MWRs differ considerably across marital status and gender. The difference between married and single men is mainly driven by the present value of widow benefits which make up nearly 20% of total expected benefits. The rest, 8 to 10%, can be explained by differences in life expectancy. Differential mortality is relatively unimportant for women. The discussed introduction of a widower benefit would increase the MWR for married women by approximately 4%. This low increase is due to longevity differences between men and women and the fact, that husbands are generally older. Taking present labor market participation and wages of married women, a widower pension would increase pension funds' expenditures by less than half a percent on average.

The fact that widow benefits make up for a relatively large fraction of anticipated pension benefits for married men also explains the sensitivity of the MWR with respect to the age difference between spouses as demonstrated in Figure 6.<sup>22</sup>

The reported numbers can only convey an incomplete picture of the variation of MWR across different groups of the population. In this context, two important aspects are worth mention. Firstly, potentially *eligible children* are not included in the analysis. The reported numbers thus underestimate the true MWR for married men. Although women may also claim children benefits in theory, the probability of them doing so is very small for obvious reasons. Secondly, *differential mortality* is only accounted for with respect to marital status, but not with respect to income. This effect increases the variation of MWR especially among men.<sup>23</sup> Note that richer men are more likely to be married, and if married, are more likely to be married to a younger woman and have eligible children upon retirement.

## 4.2 The choice between a lump sum and an annuity

The choice between a lump-sum capital payment upon retirement or a life-long annuity is offered by many DC pension plans in Switzerland. As a consequence of the high fragmentation of the second pillar reliable information on individual

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<sup>22</sup>The analysis neglects the fact that couples usually coordinate their retirement decision. See Falkinger & Winter-Ebmer (1996) for a nice illustration of this effect.

<sup>23</sup>There are no detailed studies of differential mortality with respect to income in Switzerland. The situation is likely to be very close to countries like the Netherlands (Nelissen (1999)) and Germany (Reil-Held (2000)).

decisions is difficult to obtain. We do have, however, some data from a limited pilot study, analyzed in Bütler & Teppa (2002).<sup>24</sup>

The expected return for each of these two options depends crucially on an agent's gender, his/her expected life-time and marital status (see also Table 2), the presence of children under 18 (for which a substantial supplementary benefit is due), as well as his/her perceived ability to manage the assets in case of a one-time capital payment.

Present value considerations would predict the following patterns: Because (single and married) women live longer than single men on average, the former should choose an annuity, and the latter a lump-sum capital payment. Married men, like women, should also prefer an annuity due to the high value of the provided survivor insurance. As the expected life-span is correlated with wealth (differential mortality), richer pensioners should opt for an annuity, and poorer for a one-time capital payment. Richer agents, however, also benefit more from the preferential tax treatment of capital payments,<sup>25</sup> and are potentially more capable of managing a large fund. Together with the desire to leave bequests,<sup>26</sup> these factors may offset the advantage of an annuity for the more affluent to a certain degree.

Despite data limitations, a number of interesting results can be drawn from the data base. Most importantly, the data analyzed clearly exhibit an "acquiescence bias", meaning that a large majority of retirees chooses the standard option upon retirement, despite sizeable differences across different plans.<sup>27</sup> As in most plans, the standard option is the annuity, only 23% (13%) withdraw their accumulated retirement assets entirely (partially) in the form of a lump sum.

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<sup>24</sup>The data also contains some information concerning early retirement. The corresponding findings, however, are even more preliminary than for the choice between an annuity and a lump sum as the data are contaminated by various factors. Nevertheless, two results stand out to be robust. The first is that early retirement seems to be *the* dominating option regardless of individual characteristics. If early retirement is possible, most people opt for it. The second result is that within the analyzed plans, the "rich", i.e., pensioners with higher levels of accumulated pension capital, often retire earlier than the "poor".

<sup>25</sup>In Switzerland, there is clearly a tax advantage to withdraw the accumulated pension wealth in the form of a lump sum. This effect is much stronger for high and very high levels of capital.

<sup>26</sup>The higher the annuity, the lower the marginal utility of consumption. People might prefer to hold their pension wealth in the form of capital to be able to bequeath it to their children.

<sup>27</sup>For further references concerning the acquiescence bias and other choice anomalies in funded pension plans see Benartzi & Thaler (2001) and Hurd (1999).

We also find that those who do deviate from the standard option generally do so as expected from theory. Not surprisingly, married men with children always choose the annuity. The probability of taking the capital lump sum option shows a U-shaped dependence on total capital at retirement. For low levels of accumulated capital the likelihood to withdraw it is decreasing. The most plausible reasons are differential mortality and magnitude effects. The latter effect is well documented in the literature (Shane, Loewenstein & O'Donoghue (2002)). A relatively small amount of money is more likely to be withdrawn in the form of a lump sum, as it would only guarantee a low annuity. For higher levels of accumulated capital the attractiveness of (partially) withdrawing the capital as a lump sum is again increasing. This can be well explained by the preferential tax treatment, investment opportunities, and the desire to leave bequests.

At first sight the findings contradict James & Song (2001) who conclude that people frequently prioritize investment choice over longevity assurance. Almost two thirds of Swiss pensioners fully annuitize their retirement assets although the first pillar provides a subsistence level of annuitization and although the tax on lump sum withdrawals is up to three times smaller. The main reason for this finding — apart from the above mentioned acquiescence bias — probably lies in the very high money's worth ratios (still) offered by the system.

## 5 Conclusions

One of the most important lessons to be drawn from the recent developments in Switzerland has been that a high degree of confidence into a fully funded pension system, even when it had been built up over many decades, can be shattered in a very short time span. The ongoing crisis demonstrates not only the notoriously difficult long-term planning and regulation but also the importance of transparency and an adequate information of the public. As pension contracts spanning over several decades are mandated by law, property rights need to be well defined and a high standards of regulation and supervision are indispensable. The Swiss case has shown that there is considerable political pressure to rescue underfunded pension companies. The system should, therefore, also avail reinsurance, especially for benefits covering basic needs in old age.

As a consequence of the recent crisis, other interesting aspects of the Swiss system are likely to be ignored. The second pillar in Switzerland usually pro-

vides pension benefits not only in an intermediate income range, but also for high incomes. This means that basically the same rules for (survivor) benefits apply regardless of income, potentially leading to substantial (regressive) redistribution not intended by law. The factual non-separation of mandatory and non-mandatory parts of income provision in old age also potentially impedes the restructuring of a fund in financial difficulties. On the other hand, if the aim is to prevent poverty in old age (as much as poverty among widows), it is indispensable to open up second pillar pension plans for low income earners and part time workers.

Another important feature of a fully funded pension system is the design of pay-out options in the decumulation phase. The combination of mandated joint annuities with a (in general unlimited) choice between a lump-sum withdrawal and an annuity in Switzerland is certainly not optimal. The former, introduced to prevent poverty among widows, today reinforces the redistribution from single to, on average more affluent, married beneficiaries. The lump-sum option, on the other hand, potentially undermines the insurance of longevity. The system should thus be flexible enough to take into account socio-economic changes. Options that satisfy the requirements today might not be the ones that do so when the current contributors retire.

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1. Pillar: “AHV/AVS”    2. Pillar: “BVG/LPP”

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<i>Goal</i>	subsistence	living standard
<i>Financing principle</i>	pay-as-you-go	fully funded
<i>Financing sources</i>	labor income ( $\approx 70\%$ ) general taxation (20%) VAT ( $\approx 10\%$ )	labor income
<i>Employee / Employer</i>	50% / 50%	$\leq 50\%$ / $\geq 50\%$
<i>Contribution rate (payroll)</i>	8.4%	7–18%
<i>Provision / Organization</i>	government	firms & insurance companies
<i>Administration costs</i> (as % of contributions)	$\approx 1/3\%$	$\approx 8\%$
<i>Tax-benefit linkage</i>	weak, DB (relatively flat)	proportional, DC (some DB)
<i>Form of benefits</i>	<u>individual</u> annuity	<u>joint</u> annuity or lump sum
<i>Universality</i>	universal coverage	restricted coverage
<i>Accounts</i>	none	collective
<i>Redistribution:</i>		
– <i>Intergenerational</i>	+ older generations	+ older generations
– <i>Intragen. explicit</i>	+ poor, (+ women)	+ married individuals
– <i>Intragen. implicit</i>	+ women	+ rich, - single men
<i>Insurance also for:</i>	survivors	survivors, disabled
<i>Reinsurance</i>	government	Security Fund, (government?)

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Table 1: *Switzerland’s two pillars of income support during retirement. There is considerable variation among second pillar institutions, however. A + (-) before a subgroup of the population denotes a redistribution in favor (at the expense) of the respective group. Implicit redistribution in favor of women will and with the next revision of social security law.*

Gender	Marital	R.A.	$r = .04$	$r = .04$	$r = \text{EJ}$	$r = \text{EJ}$
			$g = 0$	$g = .01$	$g = 0$	$g = .01$
Male	Single	65	0.73	0.79	0.82	0.89
Male	Married (-3)	65	1.01	1.11	1.16	1.28
Female	Single	65	0.95	1.04	1.08	1.19
Female	Married (no)	65	0.98	1.08	1.12	1.24
Female	Married (+3)	65	1.02	1.13	1.18	1.31
Male	Single	62	0.80	0.87	0.90	0.98
Male	Married (-3)	62	1.08	1.20	1.25	1.40
Female	Single	62	1.02	1.14	1.18	1.31
Female	Married (no)	62	1.05	1.17	1.22	1.36
Female	Married (+3)	62	1.10	1.23	1.27	1.42

Table 2: *Money's worth ratios as a function of marital status and retirement age (=R.A.) that qualifies for full benefits. For married individuals, the number in parenthesis denotes the age difference between the spouses, or indicates the case in which no survivor benefit is available (this is the standard option for married women). As mortality differences are small between divorced, widowed and single agents, only single is reported. See section 4 for details.*

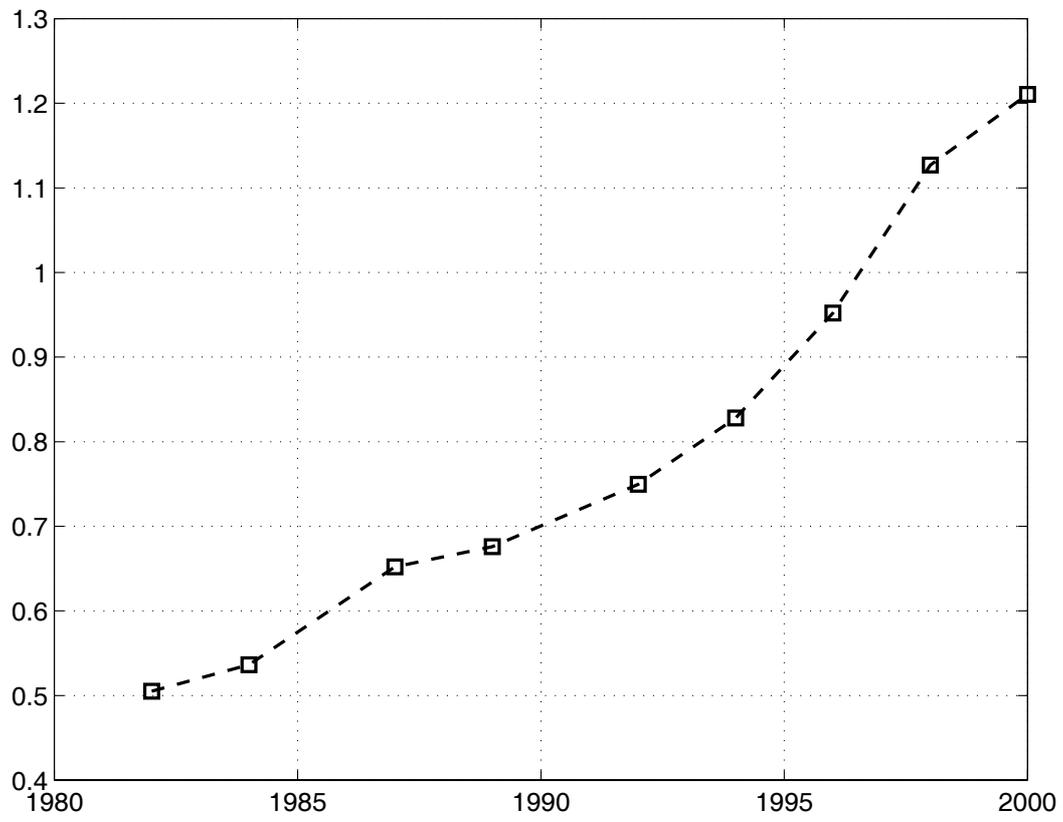


Figure 1: *Accumulated pension capital as a fraction of GDP in Switzerland.*

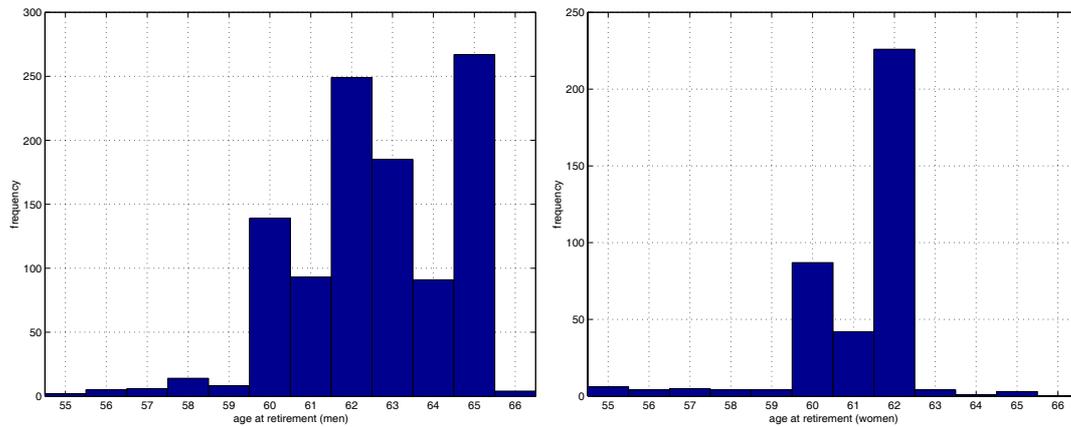


Figure 2: *Distributions of age at retirement for men and women. Data source: Pilot study on Swiss pension funds as described in Bütler & Teppa (2002).*

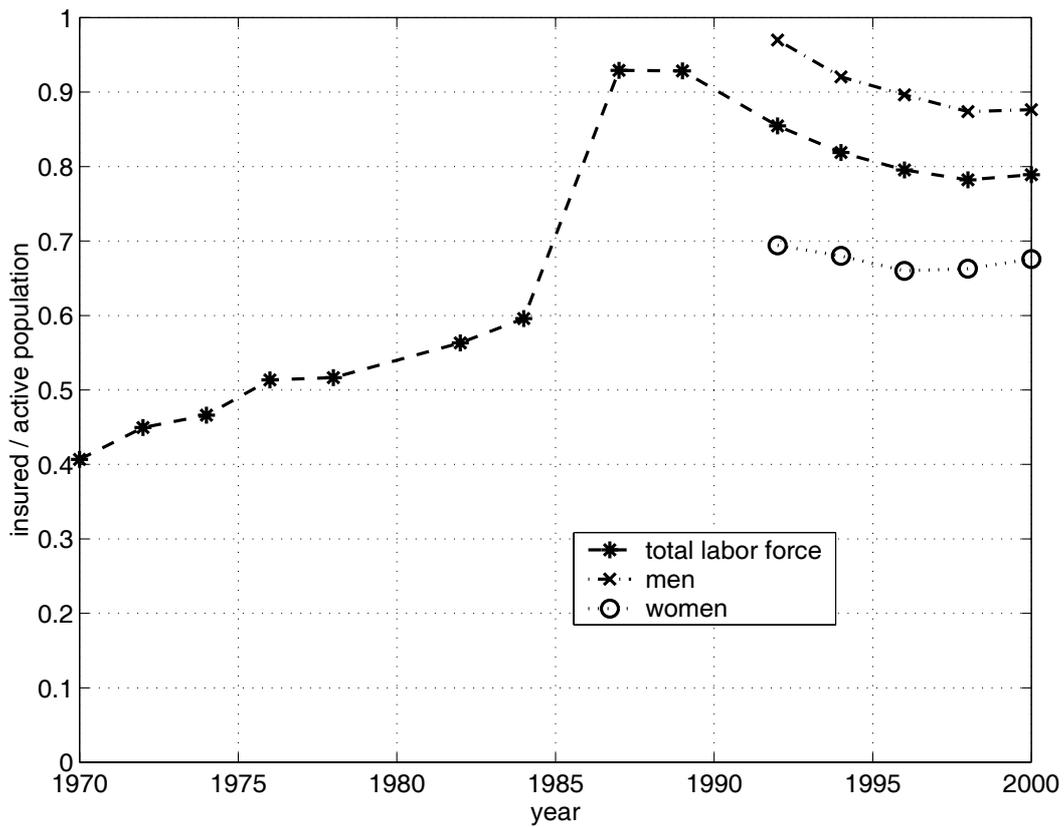


Figure 3: *Workers covered by an occupational pension plan as a fraction of the active population since 1970. The numbers are somewhat overestimated due to double-counting of insured individuals.*

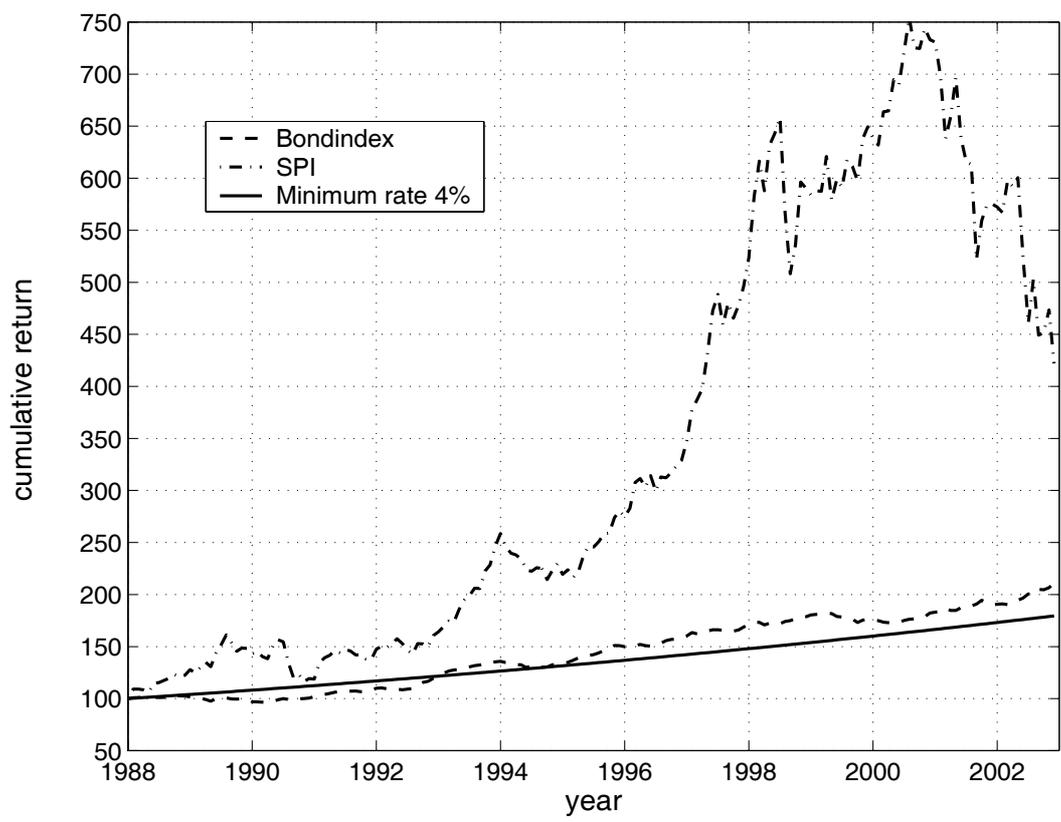


Figure 4: *Cumulated bond and stock returns since 1988 in comparison with a 4% interest rate. SPI = Swiss Performance Index.*

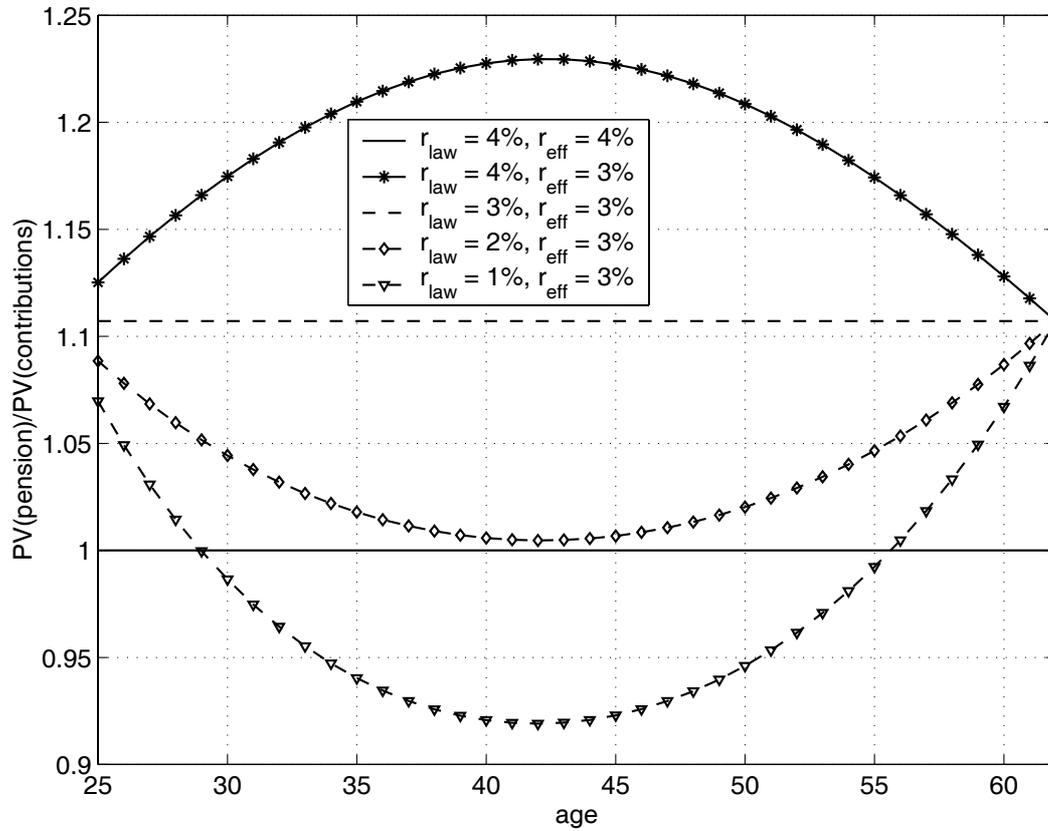


Figure 5: *Money's worth ratio for a deferred annuity with a fixed conversion factor ( $\gamma = 7.2\%$ ) as a function of age and applicable interest rates in a riskless setting:  $r_{\text{law}}$  and  $r_{\text{eff}}$  denote the legal minimum return requirement and the prevailing market interest rate, respectively. Contributions are assumed to grow at 2% annually.*

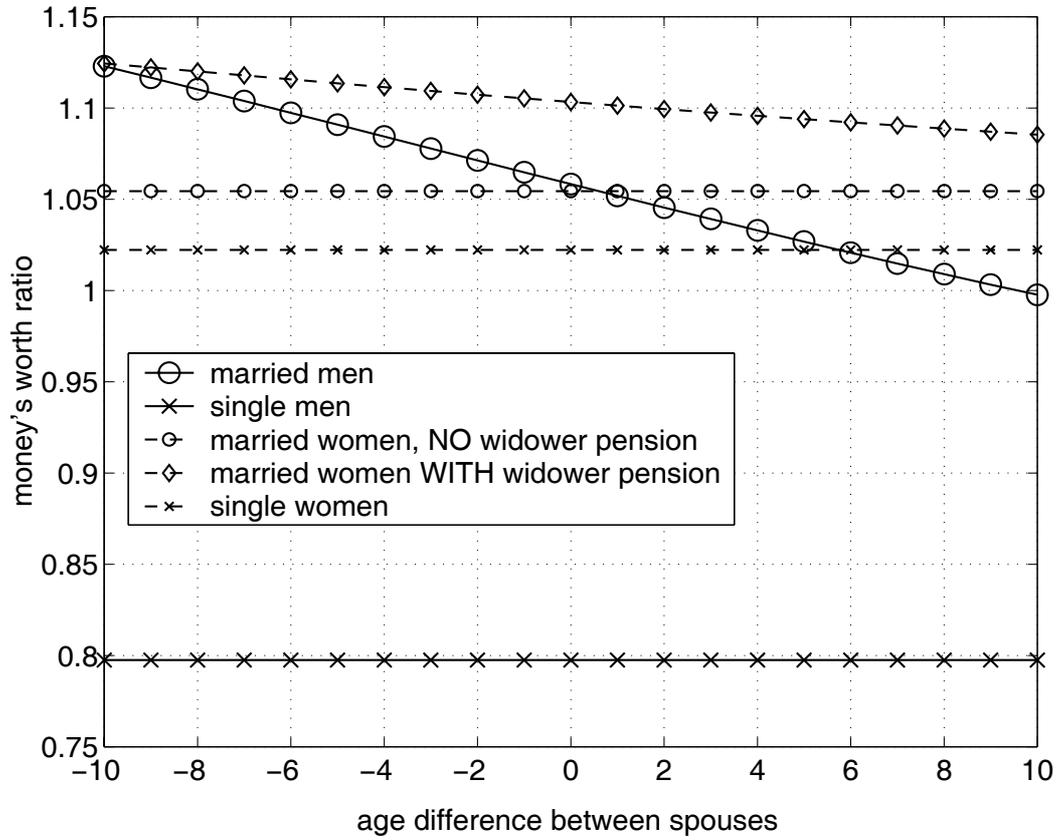


Figure 6: Money's worth ratio as a function of gender and the age difference between spouses (horizontal axis; negative numbers mean that spouse is younger). The figure is drawn for a retirement age of 62, a discount rate of 4% and a constant annuity.