How can Swiss Pension Funds and Swiss Individuals Secure a Wealthy Retirement in 2050?

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Master's thesis

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Executive Summary

Industrialized countries are more than ever faced with challenges of an increasing life expectancy and a bigger proportion of elderly population cohort. Switzerland has a highly regarded three-pillar social security system providing comfortable pension income for retirement. While the second pillar is based on a capital accumulation system and should in principle not be affected by population dynamics, the politically high guaranteed benefits led to the situation of significant transfer payments from the active working generation to retirees. In 1985, at the time of the introduction of Federal Law on Occupational Retirement (BVG), life expectancy for men and women were at least 4 years lower than today. Its operating principles on the other hand - especially the conversion rate - have only been slightly adjusted.

The aim of this master's thesis is to forecast the qualitative and quantitative effects that economic, social, and demographic factors have on today's pension funds and future pension income. This thesis presents various views of change management from institutional pension funds, politicians, as well as the working population (year of birth between 1975 and 1985) how to prepare for a sustainable future in the retirement phase. The central research question is how the basic principles of the current pension system model can be maintained the next 40 years and how individuals can retire with adequate wealth to maintain living standards at their retirement after 2040.

Many pension funds show a far too optimistic financial situation due to excessive and unrealistic technical interest rates. Especially pension funds of the public service are dramatically underfunded with funding ratios below 90 percent. The situation of pension funds is indeed challenging: the current biggest challenges for pension funds are a difficult capital market environment, retaining benefit level (i.e. financing a too high benefit level), political risks, and demographic ageing. A politically set high benefit level created solidarity between the active working employees and retirees, which resulted that 10 percent or CHF 3.5 bn. of current contributions are used as transfer payments for retirees. The young generation is not aware of this hidden solidarity and their knowledge regarding pension funds is generally low. Pension funds and their contributing customers face a new reality: with today's working time and current contributions a reduction in pension incomes up to 35 percent until 2050 can be expected.

Contributing Individuals will have to be prepared to live longer, to be ready to accept a flexible retirement age, work longer, contribute more and take on more self-responsibility. Empirical research has shown that Swiss individuals are willing to contribute more to the second pillar in order to enjoy the same pension benefits in the future. Working longer is an option for many individuals too, while receiving fewer benefits is no option at all.

Recommendations for politicians and regulators are as follows: change input parameters such as working longer and contributing more to the second pillar. Pension funds are advised to implement a fully coherent asset management strategy and optimize administration costs, where possible. Moreover, rebalancing of solidarity and the introduction of a flexible retirement age besides improving communication and a good expectation management are further recommendations. Individuals have to prepare for a new reality with a higher retirement age and – if nothing changes - less guaranteed pensions. Furthermore, it is strongly recommended to individuals to increase their pension literacy and improve their financial

planning skills as well as starting to invest both within and outside the tax incentivized third pillar.

The theoretical part of this work is based on literature regarding population dynamics and the population development in Switzerland. A mathematical model based on statistical data of VZ 2005 is built to forecast the effect of increasing life expectancy and lower capital market returns on future pension incomes. Recommendations are based on qualitative expert and non-expert structured 1-hour interviews.

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Glossary

AHV	Old age and survivors' insurance (Alters- und Hinterlassenenversicherung (AHV))
BVG	Federal Law on Occupational Retirement (Bundesgesetz über die berufliche Alters-, Hinterlassenen- und Invalidenvorsorge)
BSV	Federal Social Insurance Office (Bundesamt für Sozialversicherung)
CFR	Crude Fertility Rate
DB	Defined Benefit Plan
DC	Defined Contribution Plan
EL	Supplementary Benefits (Ergänzungsleistungen)
EO	Defence duty compensation (Erwerbsausfallentschädigung)
ETF	Exchange Traded Fund
FDF	Federal Department of Finance
FFA	Federal Finance Administration
FINMA	Swiss Financial Market Supervisory Authority FINMA
FSO	Federal Statistic Office
GDP	Gross Domestic Product
IV	Federal Disability Insurance (Invalidenversicherung)
OECD	Organization for Economic Co-operation and Development
TER	Total Expense Ratio
TFR	Total Fertility Rate
TZ	Technical Interest Rate (Technischer Zinssatz)
UN	United Nations

1 Introduction

1.1 Research Problem and Objective

This master's thesis analyses the qualitative and quantitative effects that economic, social and demographic factors will have on pension income in the next 30 to 40 years in Switzerland. Increasing life expectancy and a low fertility rate are challenging social security systems more and more and in ways that have never before existed. A rising welfare spending and in addition low birth rates, as well as a decreasing population size prompt questions regarding the sustainability of social security systems. This work investigates how the current pension models in Switzerland can be maintained the next 40 years and how to retire between 2040 and 2050 with adequate wealth to hold living standards. It further focuses on finding solutions for the generation born between 1975 and 1985 in respect of which measures this generation can take until 2050 in order to build up wealth and to be able to enjoy the same living standards as the generation retiring today.

1.2 Research Approach

The research approach of this thesis is divided into three parts: a literature review is worked out on population dynamics in general, and subsequently, the population situation is investigated for Switzerland. Moreover, the functionality of the Swiss three-pillar concept is outlined. In the second part, a mathematical model based on statistical information and formulas of VZ 2005 is created, which made it possible to calculate conversion rates and forecast the effect on future pension incomes and possible income gaps for the generation 1975 – 1985. In the third part, qualitative structured 1-hour interviews were conducted with various stakeholders and leading experts among the pension fund industry in order to assess the current challenges and work out recommendations as to how to sustainably finance the second pillar in the next 30 to 40 years. Furthermore, individuals (born between 1975-1985) were interviewed in 40 minutes interviews and asked about their trust, expectations, and their readiness to change their behavior. The collected data was analyzed in a way that feasible recommendations could be created and presented for pension funds, politicians and regulators, and individuals.

1.3 Relevance and Limitations

Population dynamics is a slow process and, compared to infrastructure bottlenecks, not immediately visible. The impact of longevity and low fertility rates, however, is huge and undisputedly a challenge for social security systems that rely on a low old-age dependency ratio. Switzerland is highly regarded as a country, which has a well-diversified old-age social security system that is based on a three-pillar-system (Swiss Federal Council, 2011). The second pillar was believed to be invulnerable to demographic shifts as it is rooted in a capital-based system. However, due to politically determined benefits, the second pillar is increasingly challenged by the payment of more benefits to retirees than they have contributed, which led to solidarity between young and old that was never designed to be in the system.

This thesis focuses on the second and third pillar. It assumes a constant AHV benefit level and does not investigate in more detail the challenges of the first pillar. Moreover, it assumes a constant real GDP growth in Switzerland for the next decades and it does not analyze direct implications of a potentially shrinking workforce in Switzerland. The analysis is based on scenarios with optimistic assumptions in regards to migration and a stable workforce. The observed implications are significant and would be more dramatic if less optimistic assumptions would be used. Finally, it analyses defined contribution plans (DC) and disregards pension funds that run with defined benefit plans (DB), as the great majority run under DC plans, and it is projected this trend will continue (Aon Hewitt, 2011).

2 Motivation

2.1 Demography as a Global Phenomena

Today more than half of the older people worldwide, 342 million, lack income security. If no actions are taken to develop old age income security, it is forecasted that by 2050, more than 1.2 billion people aged over 60 have no secured incomes (UNDESA, 2007).

2.1.1 General Demographic Changes

In the year 1800, the world population was of one billion people. This number doubled within 130 years and reached two billion by 1930. This growth then further accelerated, and in 1960, the world counted already three billion inhabitants (Moeckli, 2011). The population increased even further and faster. In the year 2011, the world counted seven billion people (UN News Centre, 2011). The UN forecasts further growth, but the pace is expected to decline and the UN estimates a population size of 9.3 billion by the year 2050 (UN, 2011). This development is unique in human history and confronts the world, but especially industrialized countries, with new challenges: low birth rates and a much higher life expectancy. In the last 60 years, not only the number of people, but also the life expectancy has increased tremendously (Ackermann and Lang, 2008). 82 percent of the world population today live in low to medium fertility rate countries, most of them are industrialized countries, where the fertility rate lies below 1.5 per woman (UN, 2011). Population growth until 2050 will take place almost exclusively in developing and fragile countries (Moeckli, 2011). Improved health care, increased wealth, healthy nutrition and high hygiene consciousness lead to an increased life expectancy. The major aspect considered in this paper is the fact that low fertility and increasing longevity lead to population ageing. Population ageing is the fastest in countries with the lowest fertility rates (UN, 2011). Without migration, Switzerland would also be very affected by this development. Before taking a deeper look into the issue of the age structure of a population, the logic of population dynamics is explained first by introducing its main factors, such as fertility, mortality, and migration. Later on, the development between 1950 and 2011 and the forecast of future scenarios until 2050 concerning the Swiss population are presented.

2.1.2 Fertility Rate

In order to study the population structure, one has to start with the fertility rate. There are several ways of measuring fertility. One of the simplest ways is to compare the number of births to the total population size in a given year for a given country (Takayama and Werding, 2011), which is called crude fertility rate (CFR). Although this gives a good indication for a country's fertility change, the total fertility rate (TFR) is a better measure, as it normalizes in respect to gender and age structure of a population (Takayama and Werding, 2011). This means that TFR measures the number of children per woman during her reproductive lifespan (between 15 - 40 years of age) under the assumption that during her fertile life cycle she has as many children as all women of the same age have in that year and country. In order to sustain a population size, a woman must have on average 2 children (McFalls, 2007). Due to the fact that not all children survive until the age they can get their own children, a replacement fertility rate of slightly above 2 is required. This replacement

rate is lower in developed countries with a low mortality rate than in developing countries with a higher mortality (McFalls, 2007).

The worldwide fertility rate is currently 2.56 (Moeckli, 2011). According to the report *UN World Population Prospect*, the average worldwide fertility rate will drop to 2.02 by the year 2050, which means a declining population in the long run (Moeckli, 2011).

2.1.3 Mortality

In order to measure how the population structure changes, the second component, mortality, has to be taken into account. Mortality is a good measure for observing changes in the population size, but not changes of the age structure of a population. Hence, life expectancy is a better measure to determine changes in the age structure of a population. While mortality only observes the number of deaths per year in a country, life expectancy measures the expected lifespan of a newborn. The average world life expectancy of a newborn in the year 1950 was only 47 years, in 2009, it was already 68 years (AXA, 2011). This means a global life expectancy increase of 1 year every 2.8 years. One of the consequences is the increased number of people aged over 60. In 2011, 739 million people were aged over 60 and this number will increase to 2 billion by 2050 already (Moeckli, 2011). Interestingly, the life expectancy of higher educated workers compared to low skilled labour differs for instance for a 35 year old by 7 years (Couet, 2005). Hence, it can be concluded that education has a direct effect on life expectancy.

In order to explain population dynamics, still ignoring migration, a four phase model can give a sound explanation on how a population develops (McFalls, 2007). Pre-industrialized phases are characterized by high fertility, high mortality and a low life expectancy. As countries industrialize and develop, mortality decreases due to better health care access, hygiene, and better livings conditions. At the same time, life expectancy increases (McFalls, 2007).

Figure 1: Stages of Demographic Transition
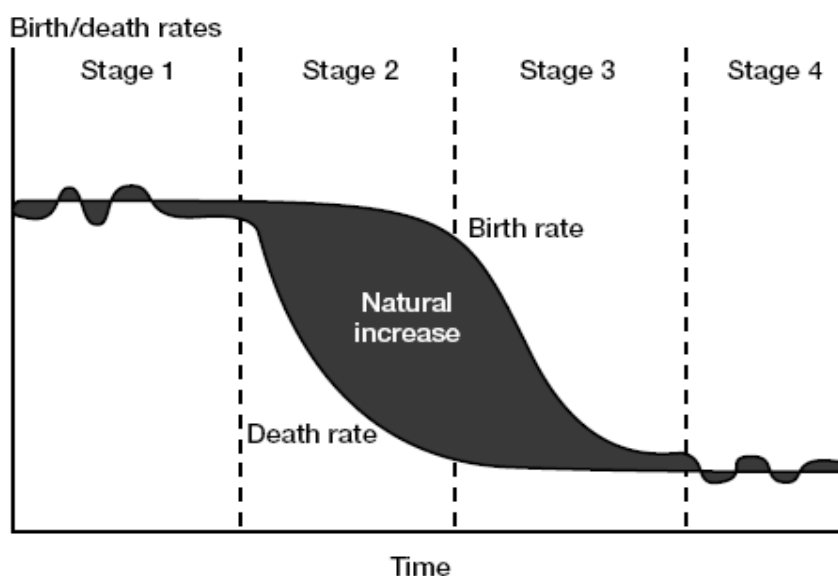
Source: McFalls, 2007

The initial fall in mortality rates (Figure 1) is mainly a drop in child mortality (McFalls, 2007). The excess of births over deaths leads to a population boom, which is often referred to a baby boom generation. In stage three, fertility and mortality will eventually balance at a low level. Finally, in the last phase that most European countries are in, the population is ageing and shrinking, as fertility decreases even more. The phenomena of an ageing population are currently visible in industrialized countries. In a few decades, however, this problem will also be present in developing countries (Moeckli, 2011).

2.1.4 Migration

The last factor of population dynamics and an important measure to determine population structure is migration. Migration has various causes, such as factors in the origin countries like wars or economic downturns, but also in the destination countries, such as economic prosperity (Moeckli, 2011). The UN estimates 96 million migrants between 2010 and 2050, of which most move from developing countries to developed countries.

In conclusion, if taking fertility and subtract mortality for a given country's population, a natural increase or decrease can be observed. Adding or subtracting migration will eventually result in a net population change (McFalls, 2007). Migration affects small countries, such as Switzerland, greatly, which will be analyzed more deeply in the subsequent chapters.

2.2   Population Dynamics in Switzerland

In 1900, Switzerland had a population of 3.3 million, which increased by one to two percent per annum and reached 4.7 million in 1950, and 7.3 million in the year 2000 (FSO, 2010). The Federal Statistic Office (FSO) estimates that Switzerland reached 8 million inhabitants in summer 2012 (FSO, 2012c). The growth in year 2010 was of 1 percent, of which 79 percent were due to immigration. Between 1980 and 2010, the average increase in population was of 0.8 percent. This makes Switzerland one of the most dynamic countries in Europe in terms of population growth (FSO, 2010). In the last 100 years, Switzerland experienced a population decline only in 1918 and from 1975 to 1977 due to pandemic and economic recessions respectively.

2.2.1   Life Expectancy

Mortality has decreased over the course of the last decades. In international comparison, Switzerland enjoys one of the highest life expectancies after Japan. This leads to a rapidly ageing society and, eventually, also a shrinking society (FSO, 2011d).

Figure 2: Life Expectancy at Birth
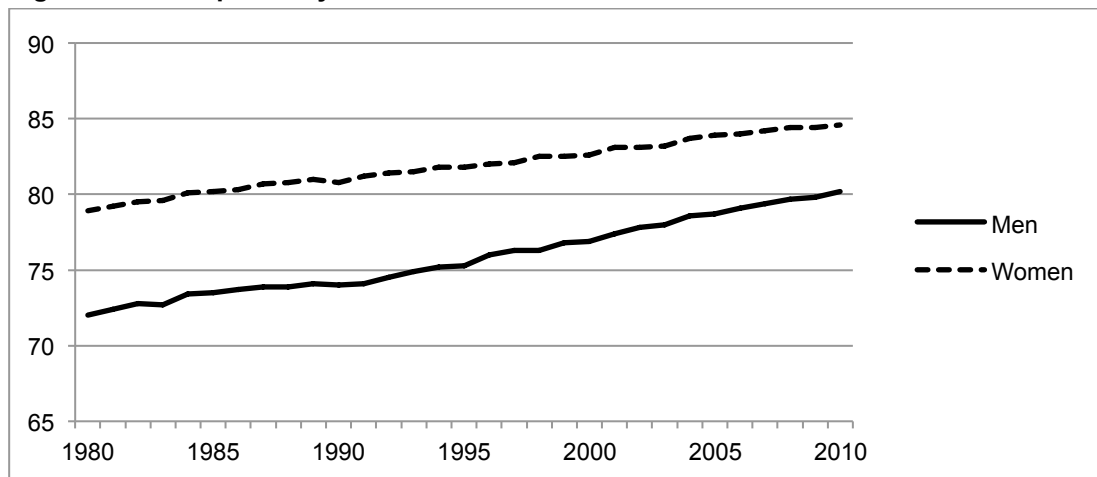
Source: Author based on FSO, 2012d

The projected life expectancy at birth provides a sound indication for a fast increase in life expectancy. For both men and women, the projected life expectancy has increased approximately 10 years over the last 50 years (Figure 2).

Figure 3: Life Expectancy at Age 65
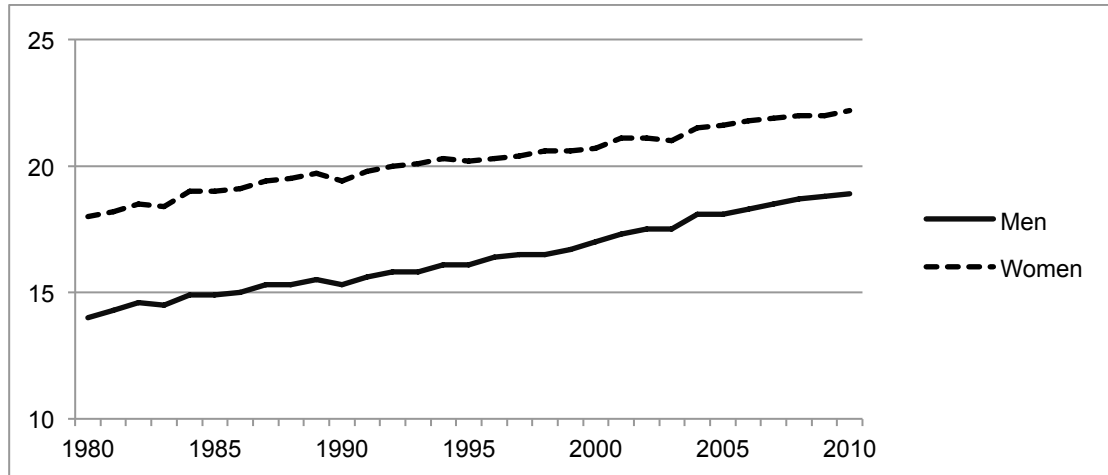
Source: Author based on FSO, 2012d

In 1960, a woman could expect a remaining lifetime of 15.1 at the age of 65. Only 50 years later, the remaining life expectancy at this age increased by almost 7 years to 22. The increase of the remaining life expectancy for men is similar, from 12.9 in 1960 to 18.7 in 2008 (FSO, 2012d). The probability of living longer increases with every further accomplished year of life. This is the explanation for the remaining life expectancy at age 65 being higher than it would have been at the time of the person's birth. The remaining life expectancy is one of the most relevant factors to look at for pension systems.

2.2.2 Total Fertility Rate

TFR decreased over the last decades, but had a slight reversal since 2001 and is now around 1.5 per woman.

Figure 4: Total Fertility Rate in Switzerland
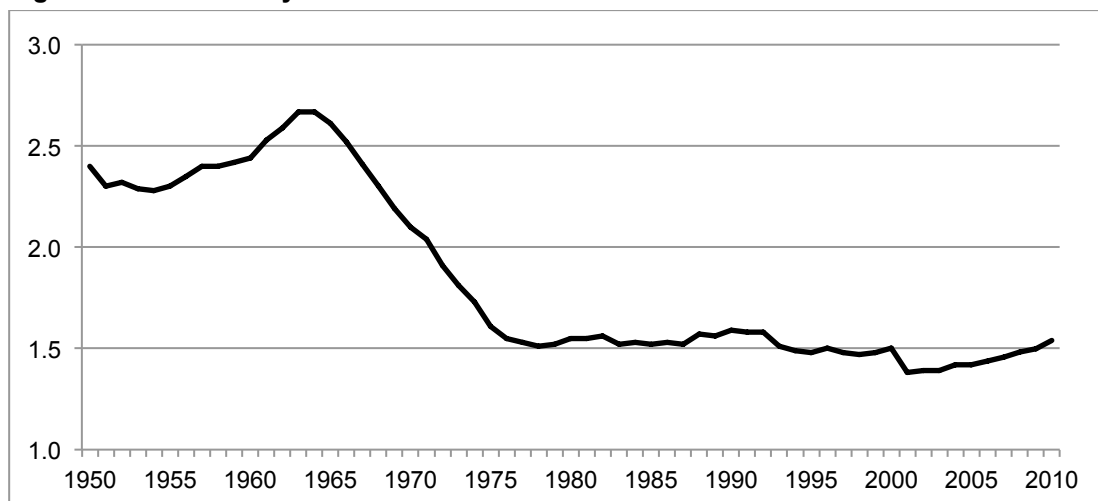
Source: Author based on data FSO 2011

The FSO has been forecasting scenarios for population dynamics since 1984 which usually forecast the next 50 to 60 years (Moeckli, 2011). They work with three scenarios: the base scenario continues the current trend, the high scenario is based on optimistic assumptions

such as high population growth, and pessimistic assumptions such as low population growth underlie the low scenario. According to the base scenario of FSO, the fertility rate is estimated to be 1.5 in year 2050 (FSO, 2012d).

2.2.3 Old-Age Dependency Ratio

The Old-age dependency ratio is a frequently used measure to observe the ratio between citizens aged over 65, and thus inactive in terms of permanent employment, over those who are active (aged between 20 and 64). This ratio expresses the percentage of people that are inactive over those that are active (Moeckli, 2011). Although this ratio is useful to demonstrate the changes of the population structure, it has to be used with care, as not all inhabitants under 64 are productive (unemployed, drug addicts etc.) and not all people aged 65 and over are in retirement.

The projected old-age dependency ratio according to the base scenario of FSO shows a tremendous increase of older people in relation to young people. While the forecasted number of newborns is fairly constant, the proportion of the Swiss population aged over 65 will significantly increase and reach over 50 percent by the year 2040. This could be interpreted as two active working citizens for one inactive or retired person.

Figure 5: Old Age Dependency Ratio
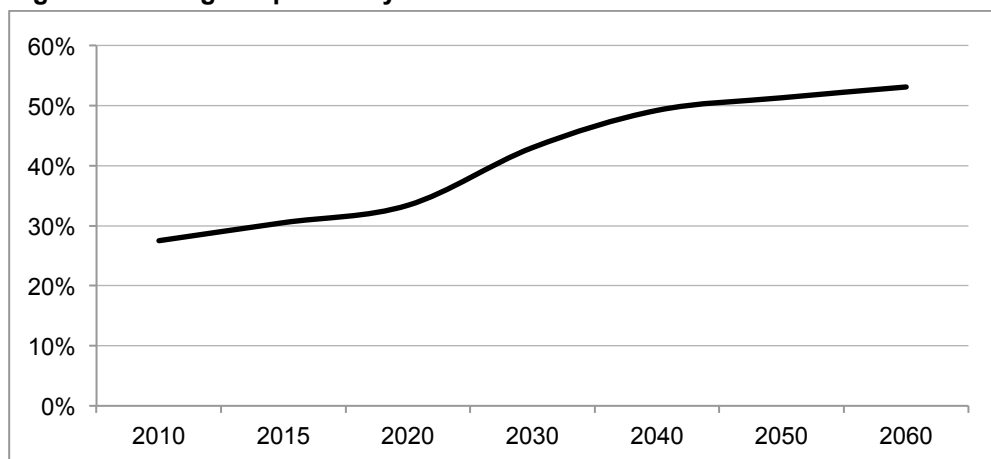
Source: Author based on FSO, 2012e

2.2.4 Active Working Population

In 1960, people aged over 65 made only a 10.3 percent proportion of the population in total; in 2008, it was already 16.6 percent (FSO, 2012c). At the same time, the working age population (aged 20 to 64) accounted for 62.2 percent of the population in 2008, compared to 57.9 percent in 1960 (which reflects a bigger proportion of the younger generation). Against past predictions, the current scenarios of the federal council predict a constant active working population of around 4.5 million until 2060 (Moeckli, 2011). Hence, mainly the proportion of elderly citizens grows, while the active working population remains fairly constant (Figure 6).

According to the base scenario, the number of children and adolescents will decrease from 21 percent today to 18 percent by 2060. With a stable fertility rate and decent migration, this

is not troublesome. People aged above 65 will increase from 17 to 28 percent of the total population in the same period. Those data are sensitive to a change in fertility rate and migration. Not only will the population size of people aged above 65 increase, but also their life expectancy. According to the base scenario of the FSO, the average remaining life expectancy at age 65 will increase from 18.7 to 26.1 for men and from 22 to 28.8 for women by the year 2060. This is an average increase of 1.2 years for every ten years (FSO, 2012d).

Figure 6: Population Structure Switzerland 1960-2060
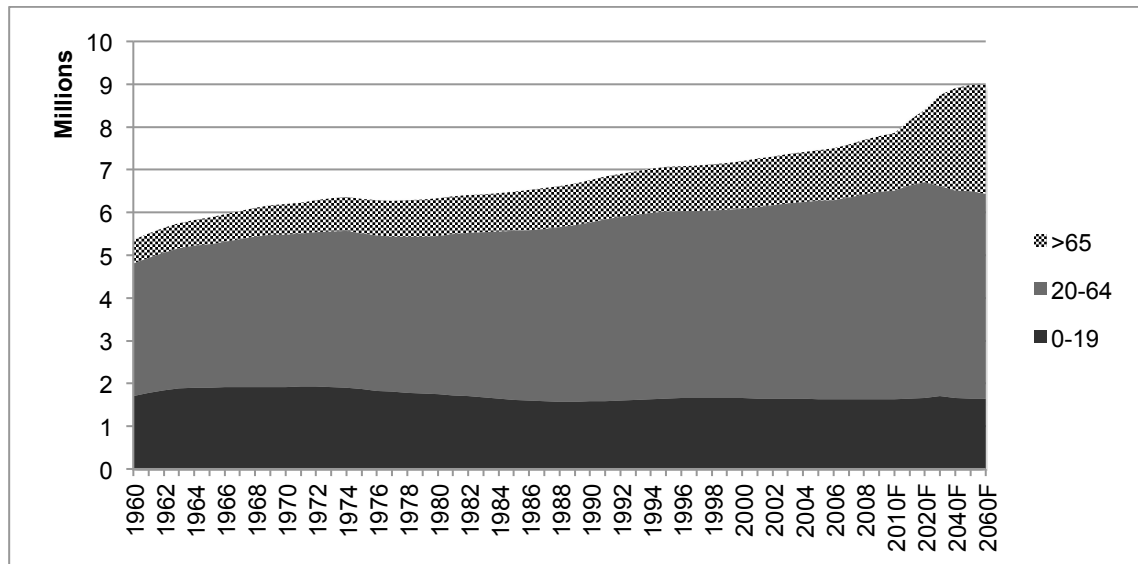
Source: Author based on data FSO, 2012e

2.2.5 Migration

Reasons for migration are diverse. For Switzerland, probably the most relevant factors are the economic situation and the job market (FSO, 2012c). The growth of the population in Switzerland since 1980 is mainly due to the positive immigration component (Moeckli, 2011). This can be empirically proven, as the net migration has been positive almost every year since World War II. A prosperous economy and an increasing labor demand stimulated this. Only between 1974 and 1978, when the oil shock hit the global economy, and eventually the Swiss economy, net migration became negative (Moeckli, 2011). Since 1997, migration rose significantly. With the introduction of the free movement of persons in 2007, the net migration rate rose to over 100,000 in 2008 (Figure 7). The majority of people moving to Switzerland are aged between 20 and 39 (Moeckli, 2011). Foreigners do not only rejuvenate the whole population in Switzerland, they also have a positive impact on the fertility rate and contribute to the working population (Moeckli, 2011). Remarkable is also the fact that, in recent years, highly educated workers have come to Switzerland and not anymore lowly skilled (Moeckli, 2011). Higher skilled labor results in higher wages, higher taxes, and higher social contributions in Switzerland.

The growth of the Swiss population is mainly due to naturalizations and not higher fertility rates (Moeckli, 2011). Without a positive net migration, the population in Switzerland would clearly decline, as the numbers of low fertility rates of the recent past show.

Figure 7: Net Migration
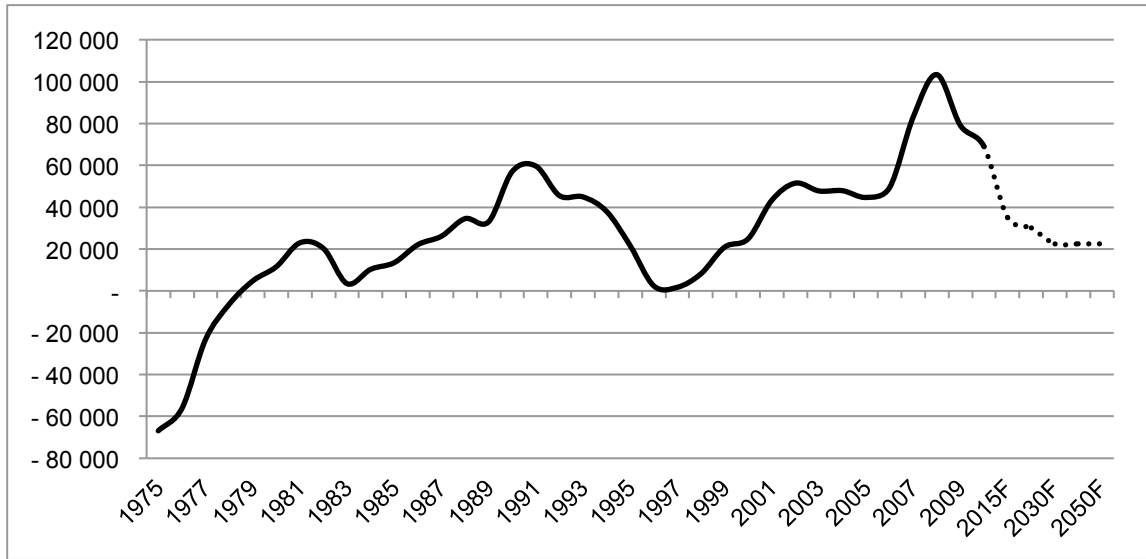
Source: Author based on FSO, 2011 and Geier, Zahno and FFA, 2012

The FSO estimates a reduction of the net migration from around 70,000 per year in 2010 to 22,500 by 2050, according to the base scenario. This reflects a long-time average net migration figure. Between 2012 and 2017, however, a strong increase in net migration is expected due to extended free movement of persons with the EU (FSO, 2010c). In Europe, only Luxemburg and Liechtenstein count with higher migration than Switzerland (Groth, 2009). Migration can be regarded as the main driver of development of the Swiss economy (FSO, 2012c).

3   Current Setup of Swiss Three Pillar System

In order to analyze future pension incomes, a brief look should be taken at the social security system in Switzerland in general.

3.1   Financing Social Security in Switzerland

Since 1950, just after the introduction of the AHV insurance, social security costs have been increasing enormously. Total security expenditures increased between 1990 and 2008 even at a higher pace, from CHF 64.8 bn. in 1990, to CHF 142.5 bn. in 2008. Relative to GDP, it increased from 20 percent in 1990, to almost 30 percent in 2008. These increased spending in social security is due to a growing social state, increased number of employees, and a higher number of persons that have to rely on social security benefits (including old age beneficiaries) (Moeckli, 2011). In 2009, 1.9 million people were entitled to AHV benefits, receiving CHF 31 bn. per year. According to the base scenario of the federal council, in 2025, 2.3 million people will be entitled to AHV benefits (Moeckli, 2011). Until 2030, the yearly AHV benefits will increase to CHF 53 bn. Population dynamics will have a great impact on the social security system, and especially on the AHV. People will live longer and the number of retirees compared to the active working population will increase. This will lead to the challenge of increasing intergenerational solidarity in order to finance the AHV. The federal council projects the future financial needs for AHV based on a base scenario that assumes a real increase of GDP and of salaries of 1 percent per year and an unemployment rate of below 3 percent. Under the base scenario and under the assumption that no corrective measures are taken, it is forecasted that AHV will accumulate a deficit as high as CHF 10 bn. in the next years (Rossier, 2011). It will be inevitable to introduce new reforms in order to maintain a balanced AHV system. Many measures, such as increased salary contributions, would lower real salaries and real purchasing power (Moeckli, 2011). Productivity and GDP growth above projections could mitigate such measures. Currently, contributions from foreign citizens to the AHV make up 26.7 percent of total contributions, while foreigners only receive 16.5 percent of total AHV pensions (Rossier, 2011).

Figure 8: Social Insurance Expenditures in Switzerland
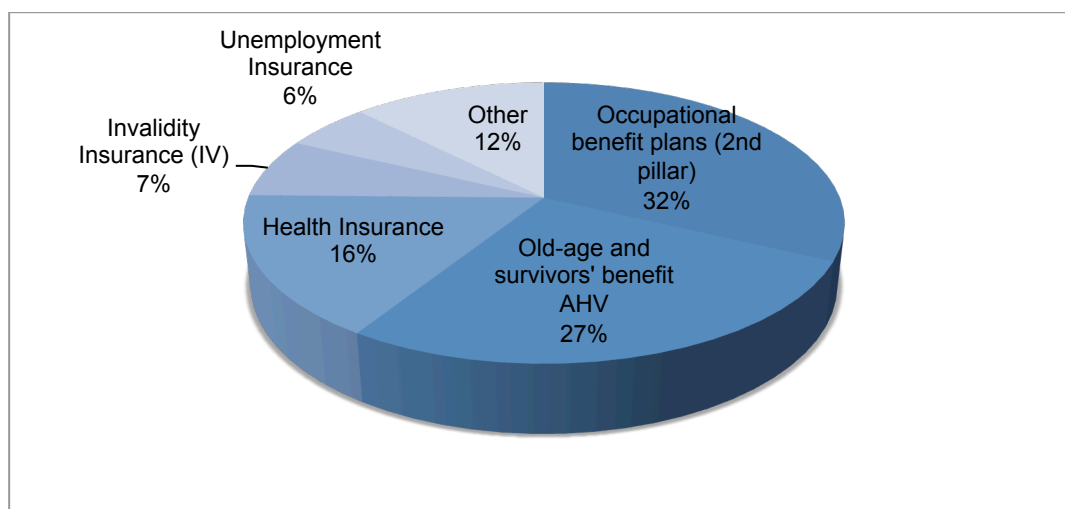
Source: Author based on BSV, 2012 (data year 2010)

Figure 8 shows the social security expenditures. It is remarkable that today, more than 50 percent of the total social security expenditures is due to old age pension benefits (pillars 1 and 2).

The impact of the population dynamics in Switzerland on the first pillar is tremendous: the dependency ratio will increase from 29 percent to over 50 percent in 2040 and to 56 percent by 2060 (Figure 9) (Mueller and Eichler, 2012).
Possible scenarios for the future for financing the first pillar are increasing contributions, increasing the retirement age, and increasing value added taxes in favor of AHV (Mueller and Eichler, 2012).

Figure 9: AHV Dependency Ratio
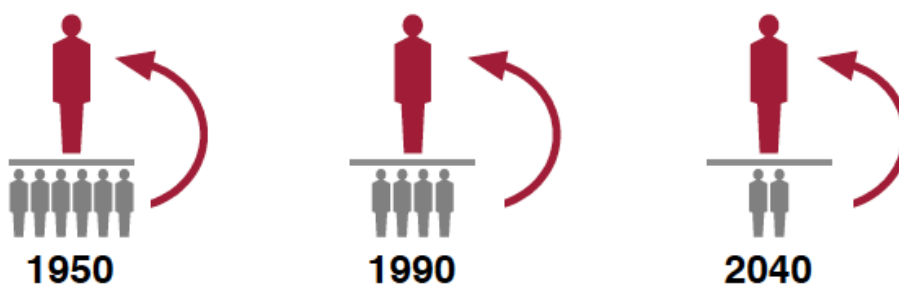
Source: Swisslife, 2011

3.2   Setup of Swiss Three Pillar System

The social security system for Switzerland presented in the following gives the reader an overview and a basic understanding of the underlying mechanism for the three-pillar-system in Switzerland. It does not claim entire completeness and it focuses mostly on aspects that are related to occupational old age pensions (pillar 2).

Figure 10: Swiss Three-Pillar-System

Three-Pillar System		
Pillar 1	**Pillar 2**	**Pillar 3**
State pension	Occupational pension	Private pension
Securing a minimum standard of living	Maintenance of current standard of living	Individual supplement
AHV/ AVS-IV/ AI · Supple-mentary benefits	Mandatory BVG/ LPP-UVG/ LAA · Extra-mandatory pension provision	Tied pension provision (Pillar 3a) · Flexible pension provision (Pillar 3b)
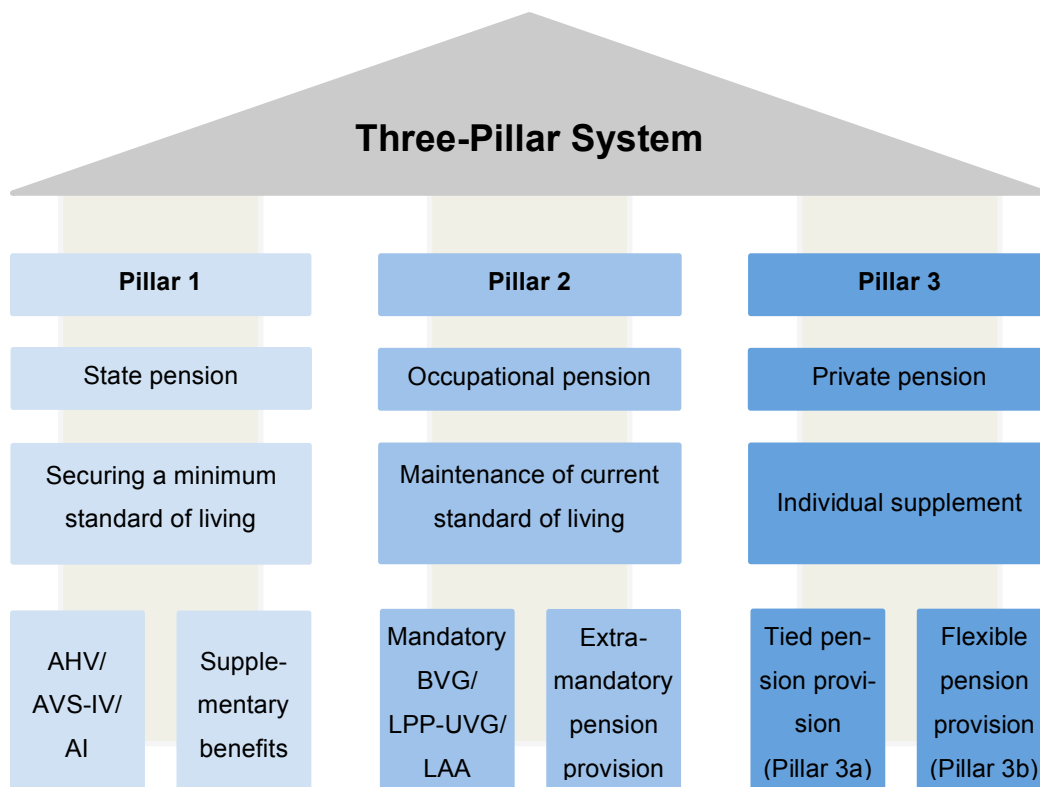
Source: Author based on Credit Suisse, 2012a

Preceding a national vote on 7 July 1947, in 1948, the state introduced a mandatory state pension system (first pillar) that compromised Federal Old Age and Survivors' Insurance (AHV) and Federal Disability Insurance (IV). Its aim was to guarantee a minimum standard of living after retirement or in case of disability (Credit Suisse, 2012a). This aim is regarded as accomplished if the two pillars can guarantee at least 60 percent of the preceding gross income before retirement (Swiss Federal Council, 2011). Due to the high cost of living in Switzerland, 60 percent of low and medium income is very likely to not be sufficient for maintaining the living standards.

Additionally, supplementary benefits (EL) for citizens without any financial means are covered. All persons aged above 17 and working are subject to contributions. Unemployed or persons with no working income are subject to the minimum contributions, as well (Credit Suisse, 2012a). Of the contributions, which have to be paid by both the employee and employer of the gross salary, 8.4 percent go to the AHV, 1.4 percent to the IV, and 0.5 percent to the EO (AHV/IV, 2012a). The benefits are calculated based on the average insured salary during the whole working life, but are limited by a floor (CHF 1,160 per month) and a cap

(CHF 2,320 per month) (AHV/IV, 2012b)[1]. In the case of a married couple, the joint pension for both from the AHV/IV must not exceed 150 percent of the cap level of one person. This means a married couple cannot receive more than CHF 3,480 per month from the first pillar.

Although various companies introduced occupational retirement plans long before this has become an obligation, *The Federal Act on Occupational Retirement, Survivors' and Disability Pension Plans* (BVG) was introduced in 1985 (Credit Suisse, 2012a) for employees (self-employed were not included). Together with the first pillar, the state pension system and the occupational pension provision were designed to guarantee an acquainted living standard after retirement. This retirement plan also includes a risk insurance against disability or death. The BVG law assures a minimum standard plan for all employees earning more than CHF 20,880 per annum (Credit Suisse, 2012a). The BVG defines minimum standards and benefits that have to be granted for employees that are insured by a pension fund. Many funds, however, offer higher benefits than the minimum requirements (Stauffer, 2009). All employees older than 17 years are insured by a pension fund against disability or death, if their annual income is higher than CHF 20,880. The majority of pension funds aim at a total replacement rate of approximately 50 to 60 percent of the insured income (including the income from the first pillar. After tax, the net replacement rate usually amounts up to 70 to 80 percent for an uninterrupted career (Grazia Zito, 2011).

The actual legally mandatory saving process starts at the age of 25. Table 1 illustrates the saving rate of a person's salary[2]:

Table 1: Salary Contributions

Age	Percentage of Salary
25 – 34	7%
35 – 44	10%
45 – 54	15%
55 – 65	18%

In addition, a risk premium against the risk of disability and other risks such as death is also owed.

The third pillar is a non-mandatory additional savings possibility for the retirement age. It is designed to close any future pension income gaps. Employees are given incentives through tax benefits to save in the third pillar. The maximum payable amount per year is currently ceiled at CHF 6,682 per year for employees and CHF 33,408 for self-employed. The regular non-mandatory contribution to the third pillar has increased from 56.7 percent in 2002, to 62.9 percent in 2008 for employees aged between 25 and the regular retirement age (FSO, 2008a). [3]

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[1] These numbers are based on the assumption that a minimum of 44 years has been contributed and retirement started at age 65 for men and 64 for women respectively. Figures valid for 2012.
[2] The employer has to pay at least 50 % of that rate.
[3] Since 2008, an employee can still contribute up to 5 years after the legal retirement age to their third pillar in case that person continues to work.

In international comparison, the three-pillar concept can be regarded as a very successful system to ensure long-term funding of the retired proportion of the population in Switzerland (Ackermann and Lang, 2008) and is highly acknowledged by OECD countries (Swiss Federal Council, 2011). On average, 80 percent of the retirement income can be financed with this system (Bolliger, 2007). This also ensures a very low probability of old age poverty in Switzerland. Furthermore, the OECD regards the Swiss model as one that is relatively well prepared in regards to financial consequences due to demographic changes (Swiss Federal Council, 2011).

According to an estimate (Swiss Federal Council, 2011), 0.5 million employees out of 3.7 million are insured with the minimum requirements of BVG[4]. Taking into account employees who are insured only marginally above the minimum, the total number is estimated 1 to 1.5 million employees who are below or just slightly above the BVG minimum. Pension funds that insure salaries above BVG minimum provide superior benefits. They are only obliged to ensure BVG minimum benefits and are free to define their benefits other than required by BVG law (Thurnherr and Waldmeier, 2011). If underlying factors such as the remaining life expectancy at age 64 or 65 respectively change, those can adapt their supra-mandatory benefits (Swiss Federal Council, 2011). Many employers offer superior pension fund benefits (which makes them more attractive compared to other companies).

3.3 Current Parameters of Pension Funds

The conversion rate determines how much money will be paid per year as a life-long annuity to a retiree according to their accumulated wealth in the second pillar (Swiss Federal Council, 2011). The technically accurate conversion rate shall be determined by the remaining life expectancy at the time of retirement and the future expected return from the remaining capital of that retiree.

The accumulated capital in the second pillar at the time of retirement is multiplied with the conversion rate that results in the yearly pension until death. To illustrate this point, it will be assumed a woman has accumulated CHF 400,000 in her pension fund capital account at her retirement age of 64. Assuming that all of this capital belongs to the BVG minimum, a yearly pension income of CHF 27,200 with a conversion rate of 6.8 percent would result (6.8% * CHF 400,000 = CHF 27,200).

The idea of a capital-based old-age pension system is the continuous accumulation of capital during one's working live. At retirement age, the accumulated capital, including capital gains, is used to be paid out to that individual until his or her death (Figure 11).

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[4] The maximum insured annual salary according to the BVG minimum standard is CHF 83,520, since CHF 24'360 is subtracted as a coordination deduction (=maximum insured salary CHF 59,160) for the insured part of the salary that is covered by the first pillar (Thurnherr and Waldmeier, 2011).

Figure 11: Old Age Capital and Annuity Pension
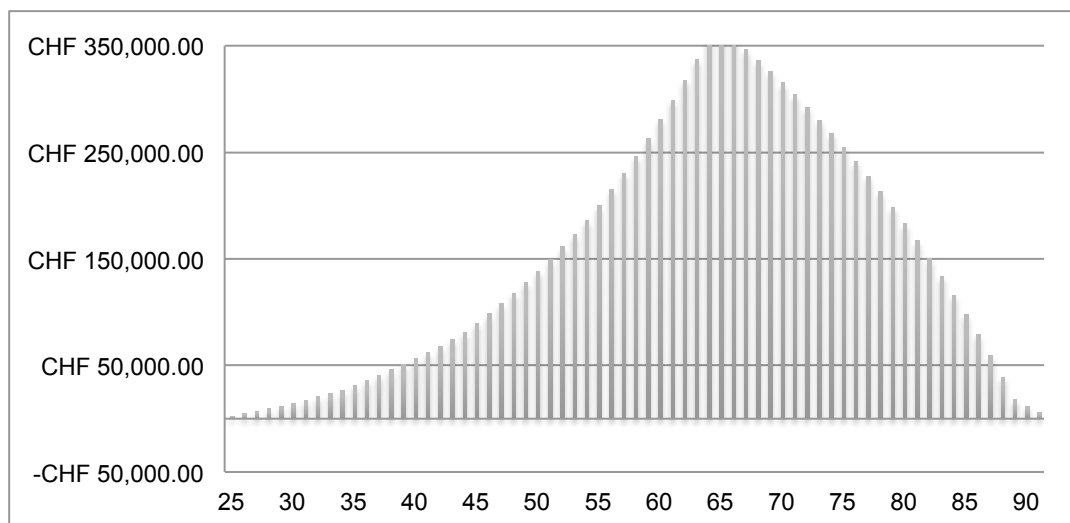
Source: Author

On the accumulated capital, a yearly minimum interest rate on the mandatory part of the capital is guaranteed, which is set by the federal council (Credit Suisse, 2012a). It has been lowered since its introduction in 1985 from 4 to 1.5 percent in 2011.

With the enactment of the BVG in 1985, a minimum conversion rate of 7.2 percent was introduced. With the first revision of BVG, the minimum conversion rate will be gradually lowered to 6.8 percent by 2014 on the BVG mandatory capital (Vorsorgeforum, 2012).

Table 1 outlines the basic parameters of pension funds and table 2 gives an overview of current beneficiaries.

Table 2: Overview BVG Parameters

	Men	Women
Pension fund entry level	CHF 20,880	CHF 20,880
BVG maximum gross salary	CHF 83,520	CHF 83,520
- Coordination deduction	*- CHF 24,360*	*- CHF 24,360*
BVG insured salary	CHF 3,480 – 59,160	CHF 3,480 – 59,160
Mandatory age contribution	25-65	25-64
BVG minimum interest rate	1.5 % p.a.	1.5 % p.a.
BVG conversion rate (2012)	6.90%	6.85%
BVG conversion rate (2014)	6.80%	6.80%
BVG minimum old age pension p.a.	CHF 1,210	CHF 1,251
BVG maximum old age pension p.a.	CHF 19,722	CHF 20,367

Source: FSO, 2012b, figures year 2010

Table 3: Pension Fund Overview

Number of pension funds in Switzerland	2,265
Number of insured employees	3,696,000
Number of retirees receiving old-age occupational pensions	599,856
Capital recipients in 2010 at time of retirement	30,200 retirees (CHF 5.5 bn.)
Total assets under management	CHF 621 bn.
Yearly pension benefits	CHF 24.1 bn.
Average return p.a. of representative Swiss pension funds 2000-2012 (Credit Suisse, 2012b)	2.04%
Current used technical interest rate (TZ) by pension funds	2 - 4 %

Source: FSO, 2012b, data from year 2010

Figure 12: Number of People Receiving a Regular Occupational Pension
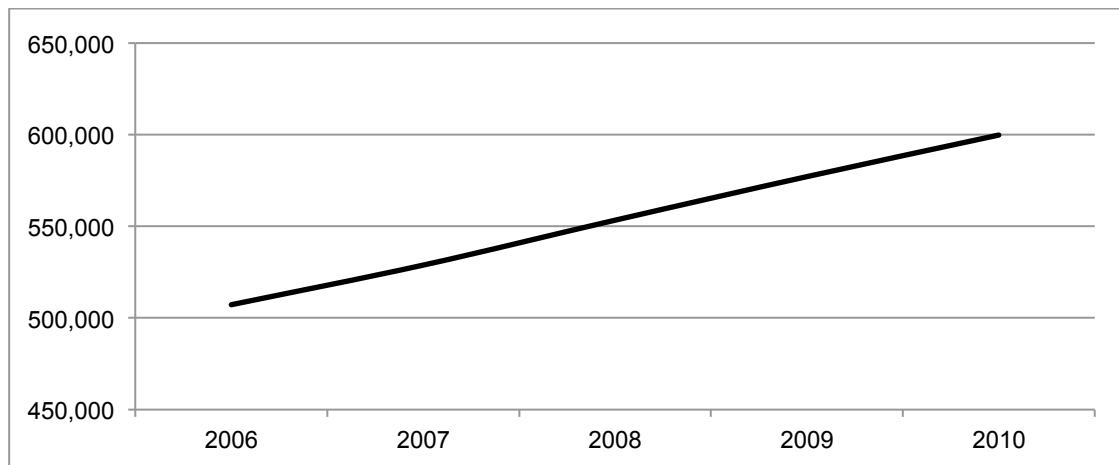
Source: Author based on BSV, 2012

Figure 13: Average Occupational Pension per Old-Age Retiree per Year
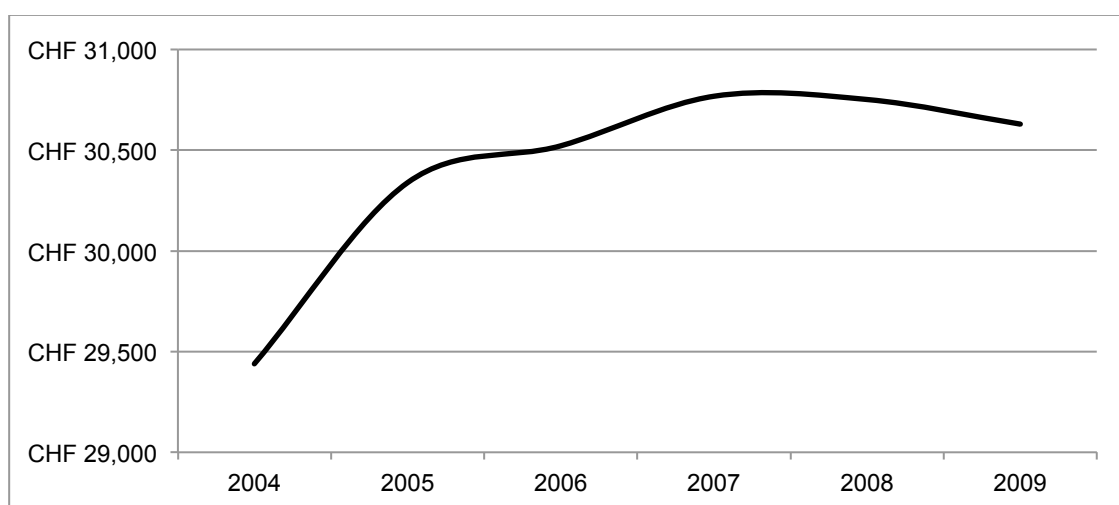
Source: Author based on FSO, 2010b and BSV, 2012

The number of regular retirees is continuously increasing with more than 22,000 persons per year (Figure 13). Important to mention is the fact that BVG law was introduced in 1985,

which means that only in 2025, a full saving period will be reached (Swiss Federal Council, 2011).

Key input factors for pension funds to determine a monthly old age pension income are the following: age at entry of retirement plan, contributions, capital returns, average remaining life expectancy at time of retirement for men and women, retirement age, and other entitlements, such as wives, children and its respective probabilities (Figure 14). In order to determine a pension income that can be financed sustainably, a conversion rate taking into account the average life expectancy and average future capital returns have to be used (Swiss Federal Council, 2011).

Figure 14: Factors Influencing the Conversion Rate
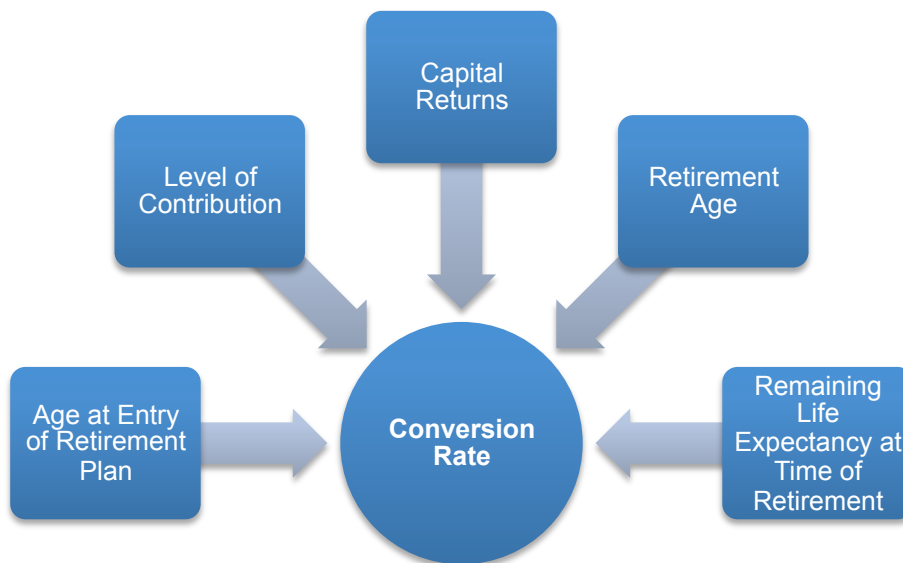
Source: Author based on Janssen, 2010.

3.4 Accumulated Wealth in Second Pillar

By the end of 2010, Swiss pension funds managed in total 621 bn. CHF. On average, 36.5 percent of the capital in total was invested in bonds, 27.2 percent in shares, and 16.5 percent in real estate (Credit Suisse, 2012b). Alternative investments, hedge funds, and liquidity made up the remaining 19.8 percent. Over all OECD countries, bonds and shares represent the most predominant asset classes with more than 70 percent over all pension funds assets. There are, however, country specific regulations that set maximum limits on each assets class. For instance, in Switzerland, pension funds are not allowed to invest more than 50 percent in shares and not more than 30 percent in real estate (BVV, 2012).

Not only is managing assets of more than CHF 600 bn. a challenge for pension funds, but also does to manage capital withdrawals and annuities from the assets under management increase the complexity of managing pension capital efficiently (Aon Hewitt, 2012). The Credit Suisse Pension Fund Index is a good proxy for the overall performance of pension funds over the last years. Hence, pension funds achieved an annualized yearly return of 2.04 percent between 1/1/2000 and 6/30/2012 (Credit Suisse, 2012b). In the same period, the annualized minimum interest rate granted on BVG capital was at 2.76 percent, which

means pension funds could, on average, not achieve a return that would cover at least the minimum interest rate on the BVG capital (pension funds with supra-mandatory capital have the option of granting a lower interest rate on the supra-mandatory capital). Although the market environment has been volatile in this period, according to the OECD, the returns under a capital based pension scheme in Switzerland should be enhanced (Swiss Federal Council, 2011).

Pension fund examples from Canada show that public pension funds were able to achieve long term yearly return of 9.7 percent between 1990 and 2012 (Lüscher, 2012). Between 2002 and 2011, the average yearly returns were still 5.9 percent. The research reveals that leading pension funds in Canada are managed highly professionally and performance incentives for asset managers are high. It is therefore not surprising that top asset managers are often found in public pension funds, which are remunerated performance based whereas in Switzerland, top managers have less monetary incentives to work for pension funds (Lüscher, 2012).

While in the 1990s the cost pressure on pension funds has been low due to the high returns achieved on the capital markets, the situation has changed fundamentally since the beginning of the 21th century. One of the reasons why pension funds do not perform better and their cost structure is not optimal are the high costs pension funds bear, not only due to administration costs, but also due to high operating, asset management, and hidden costs (Mettler and Schwendener, 2011). Although effective costs have to be reported according to Article 48a BVV2, a study by the Federal Social Insurance Office and C-ALM reveals that asset management costs of pension funds are very high. The main approach to account for all expenses related to asset management costs is the use of the total expense ratio (TER). Two main components not reported under the current governance are *non comprised asset management costs* such as fees and transaction costs within collective investment vehicles and the *booking of cost premiums for insurance contracts as insurance expenditure.* The latter refers to the non-accounting of administrative costs for risk premiums. In summary, costs incurred within collective investments or fees contained in structured products, or implicit transaction costs such as spreads are not accounted for as expenses. Pension funds report 0.15 percent of their total assets as costs related to asset management costs. However, including the two components explained above, on average, pension funds face 0.56 percent asset management costs, including all expenses appropriately (Mettler and Schwendener, 2011). From the sample group's extrapolated costs to the whole pension fund assets, all institutions together paid CHF 3.9 bn. for asset management. Especially alternative investments show a low net performance after fees due to high implicit costs for the period 2005 – 2009. The total asset management costs vary from 0.15 to 1.86 of total assets, which means that some pension funds have a great potential to optimize their asset management costs. This is crucial in times of low returns, as one percent saved in costs has the same result as one percent gained on the capital market[5] (Mettler and Schwendener, 2011).

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[5] Pension funds should evaluate and renegotiate their mandate relationships and its contract terms. Furthermore, they could improve their investment vehicles in order to reduce withholding taxes or domestic transaction taxes (Mettler and Schwendener, 2011).

3.5 Income Distribution of Retirees

The presented figures represent retirees that were regularly retired (men 65, women 64). Based on a survey conducted by the FSO in 2002 and 2005, the median gross income equivalence[6] of retirees was of CHF 47,000 per year (FSO, 2006). Women enjoy on average CHF 5,000 less pension income per year and men CHF 5,000 more. One third of all retirees only receive benefits from the first pillar (AHV and EL) (Figure 15). Those receive on average (median) CHF 40,000 (men) and CHF 41,000 respectively (women). One third enjoy additional benefits from occupational pension funds, known as the second pillar (another measure reveals that 60 percent of all retirees benefit from an occupational pension fund). This group reaches a median retirement income of CHF 52,000 for men and CHF 42,000 for women. 25 percent of all retirees enjoy retirement income from all three pillars (Figure 15 illustrates the sources of pension income from each pillar for both men and women). Those retirees are best off: men receive CHF 60,000 and women CHF 45,000 on average per annum.

Not surprisingly, the higher the education level, the higher the probability to be insured by an occupational pension fund and to eventually enjoy higher pension benefits (FSO, 2006). Nationality has also a great effect on pension income: in the two lowest quintile of pension income are 64.5 percent foreigners compared to 35.5 percent Swiss citizens.

Figure 15: Sources of Pension Income
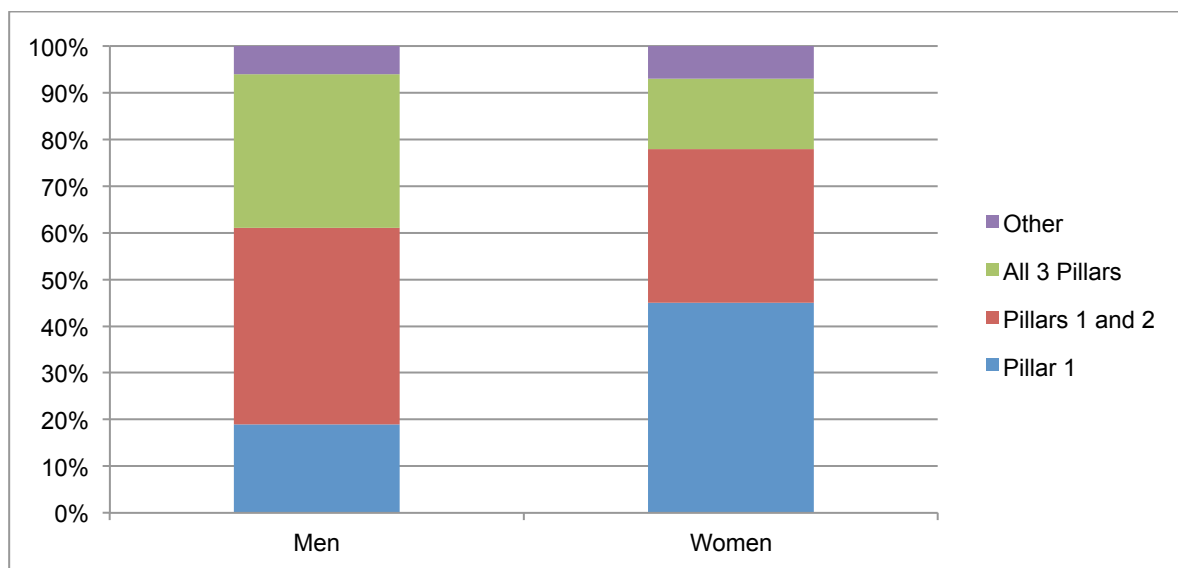
Source: Author based on FSO, 2006

The study further shows the proportion of occupational pension income (i.e. second pillar) out of total pension income; it is the highest for middle-income classes (49 percent in the second quintile and 53 percent in the third quintile). This underlines the high importance of occupational pension fund income for retirement.

Although the legal retirement age is the most common form to enter the retirement status, in 2005, 22 percent of all men and 16 percent of all women still work after retirement and 14 percent can afford early retirement between 56 and 65 (FSO, 2006).

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[6] In order to compare gross income among different sizes of households, the gross income equivalence measures the weighted income per household.

4 Pension Funds' Influencing Factors

In order to analyze the impact of population dynamics, it is sensible to distinguish between independent and dependent variables (Moeckli, 2011). Population size and population structure can be regarded as independent variables, whereas economy, politics, social factors, or health care are treated as dependent variables. More young people in a society would, for instance, increase the demand for more schools, education and child care facilities. On the other hand, an increasing proportion of retirees would increase health care spending and generate greater needs for age related services. Hence, population size and population age structure determines the extend and distribution of social contribution and benefits, and the productivity and economic potential of a country (Moeckli, 2011). This illustrates the complex interdependencies between demographic changes and economic growth. According to a theory developed by Alwin Hansen (Hansen, 1939), there is a causal interrelation between economic growth and population growth. Empirically, this theory has been proven for periods in the 1970s and 1990s. Stagnation or a declining population in the next 40 years could thus mean that, with a stable purchasing power and a constant consumption behavior, no increase in national demand or GDP growth can be expected based on Swiss consumers (Moeckli, 2011). This factor cannot, however, be regarded isolated, as other factors such as productivity increase or innovations can also have a positive effect on GDP growth.

Moreover, demography is directly correlated with public debt: there is a correlation between public debt and the proportion of a population aged above 65 (Eberstadt and Groth, 2010). The study concludes that is likely that increasing proportion of older people have a devastating influence on economic growth of a country. The pressure due to demographic changes builds up slowly but the impact on the economy (and hence social security systems) can be severe. As demographic changes can be accurately projected, Eberstadt and Groth demand to carry out demographic stress test.

4.1 Economic Factors

High employment is not only crucial to finance old-age pensions based on a pay-as-you-go scheme such as the AHV/IV system, but also to ensure that employees can contribute to their retirement plans in the occupational retirement plan (second pillar) during their active employment period (Merkel, 2012). High unemployment for a longer period would be devastating, as less money can be accumulated for the pensions (especially in the second pillar).

The Credit Suisse Swiss pension fund index, which measures 20 percent of all assets of autonomous pension funds, achieved a yearly return of 2.4 percent between 2002 and 2011 and -0.6 percent in 2011 (Credit Suisse, 2012b). Surveyed pension funds state long-lasting low interest environment (Credit Suisse, 2012b) and investment risks as the greatest challenges for them (Aon Hewitt, 2012).

Figure 16: BVG Minimum Interest Rate, 10-Year Swiss Confederation Bond Yield
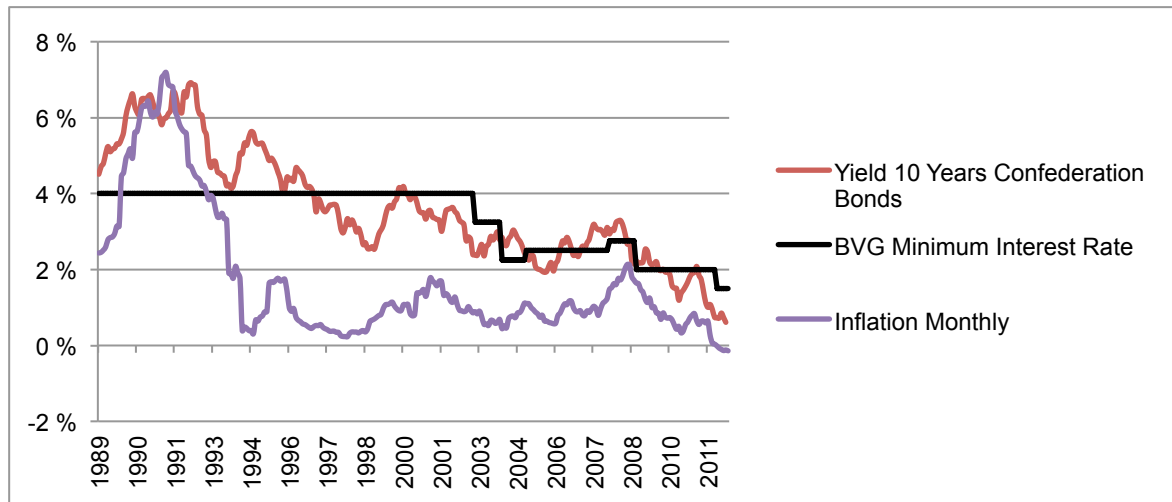
Source: Author based on SNB and BSV, 2012.

Figure 17: Real GDP Growth and Unemployment Rate
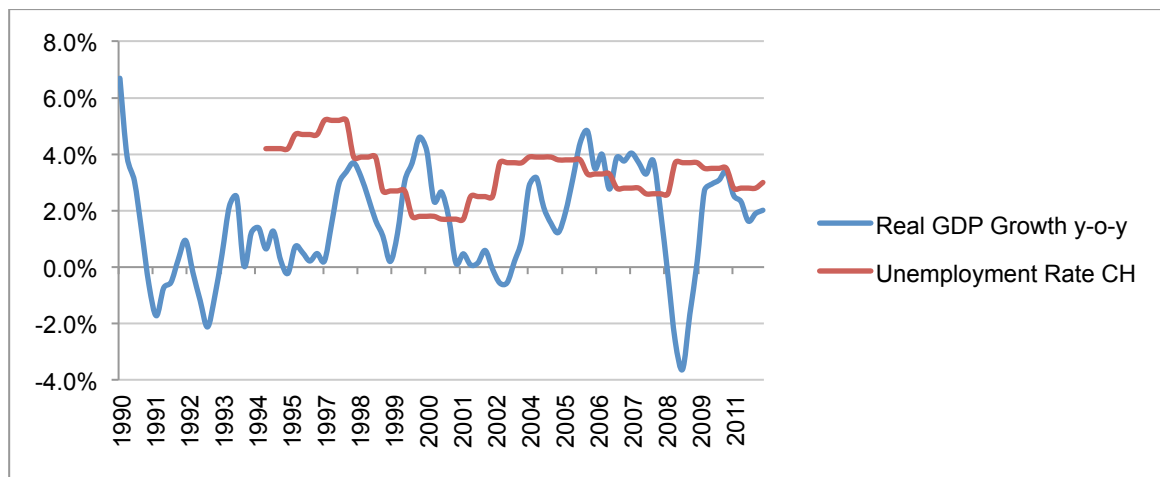
Source: Author based on SECO and SNB, 2012

The yields on Swiss Confederation bonds have dropped considerably in the last 20 years. While in the 1990s even short and mid-term money market papers gave a yield of over 4 percent p.a., today, not even 10 years Swiss Confederation bonds provide a yield higher than 0.6 percent (Figure 18). The current crisis in Europe and the policies of the major central banks create a situation where nominal interest rates are almost zero and, in real terms, even negative (Uhlig, 2012). This has the effect that secure government bonds have a greater demand than riskier ones such as those from Greece, Spain, and Italy. Eventually, as investors seek safe investments (institutional funds are required to invest in bonds above investment grade (BVV, 2012)), investors are willing to accept less return for secure investments (Uhlig, 2012). This situation forces pension funds to take active investment risks in order to achieve at least the minimum interest rate and administration expenses (Aon Hewitt, 2012).

Figure 18: Yields Swiss Confederation Bonds
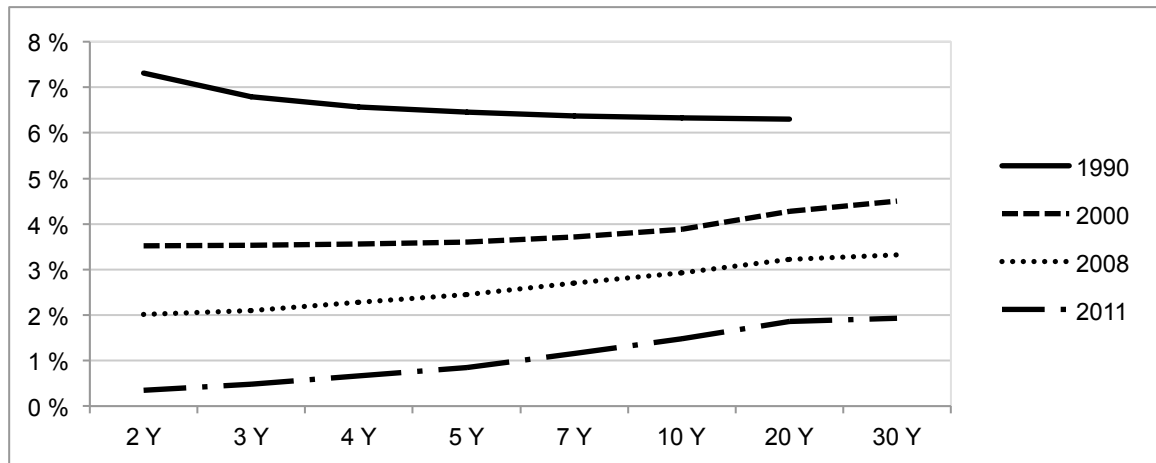
Source: Author based on SNB, 2012

Real GDP growth accelerated in 2005 and remained high until the financial crisis hit in 2008 (Figure 17). GDP recovered rapidly after the financial downturn in 2008 with real growth rates up to 3.4 percent in 2010. At the beginning of the financial crisis in 2008, the unemployment rate rose to 3.7 percent (Figure 18).

The Federal Department of Finance (FDF) (FFA, 2012) forecasts real GDP growth, social security, and health care expenditures until 2050[7]. After an increase in real GDP growth, a long-term average of 1 percent is forecasted (Figure 19).

Table 4: Macroeconomic Assumptions

Labour productivity growth	1% p.a.
Real interest rate (long-term)	2% p.a.
Inflation	1.5% p.a.
Nominal Interest Rate	3.5% p.a.

Source: Geier, Zahno and FFA, 2012

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[7] Their base scenario is a steady productivity growth of 1 percent per annum and a real long-term interest rate of 2 percent (Table 4).

Figure 19: Real GDP Annual Growth Rate
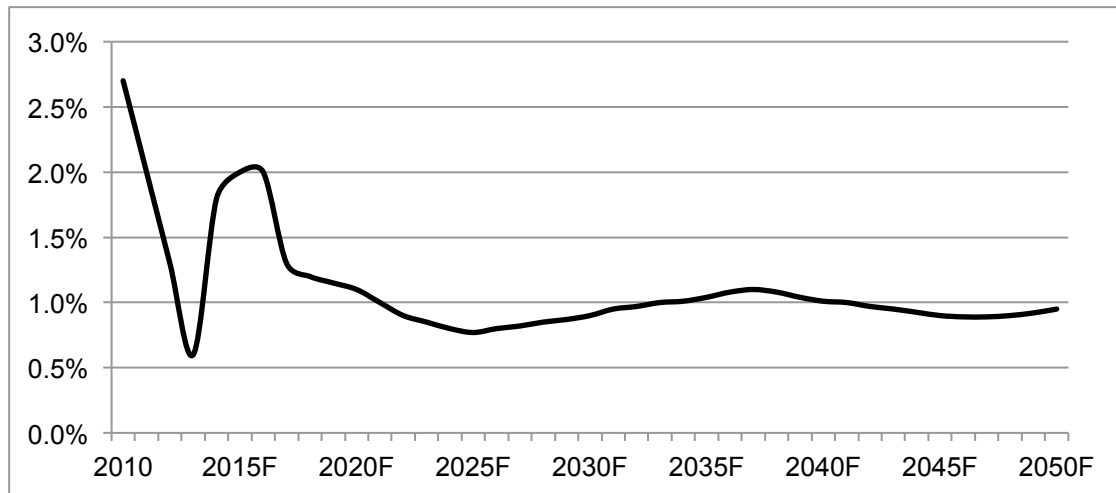
Source: Author based on Geier, Zahno and FFA, 2012

4.2 Demographic Factors

The Swiss Federal Department of Finance (FDF, 2012) estimates a disproportional increase in expenditure relative to GDP due to the predicted demographic shift in the following areas: in its long term sustainability outlook report from 2012, the FDF predicts an increase in old-age and disability expenditures of 18.8 percent relative to GDP (resulting in an expenditure of 11.4 percent of GDP) by 2050. Moreover, healthcare and long-term care expenditures will increase from 3.1 percent in 2009 to 5.2 percent of total GDP in 2050. These facts are important to mention, as the FDF predicts a much faster increase of these costs related to age and demographic changes than the overall growth of the economy.

Figure 20: Demographic-Dependent Expenditures (in % of GDP)
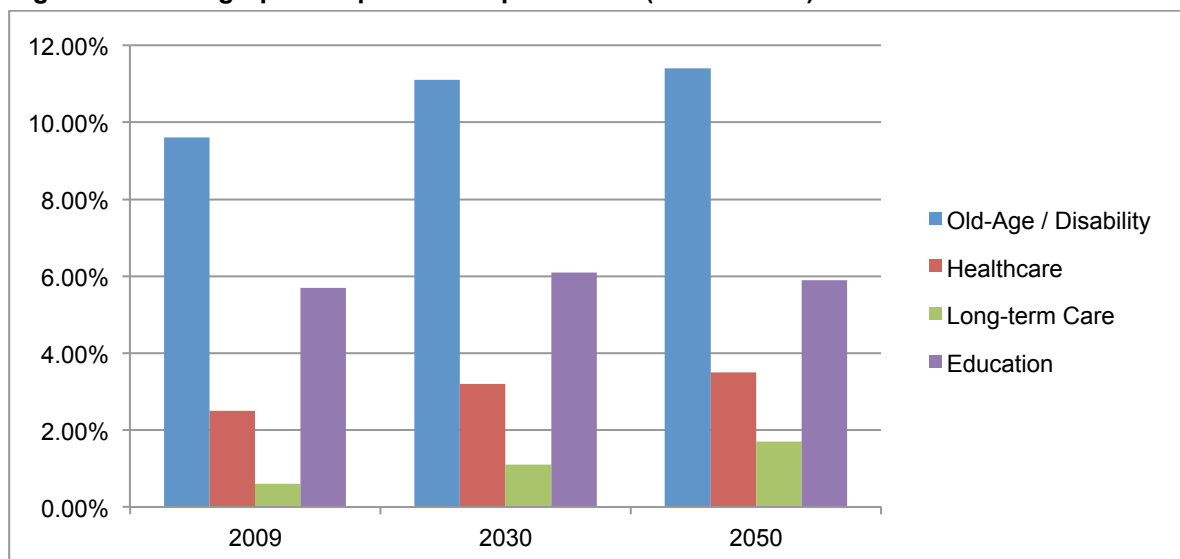
Source: Geier, Zahno and FFA, 2012

Pension schemes have been designed according to the economic and social factors that were valid for the second half of the 20th century. Today, families are shrinking, people live

longer, and work patterns are changing (Takayama, 2011). In the aforementioned survey of Credit Suisse (2012b), the surveyed pension funds state demographic changes as the second greatest challenge.

4.3 Political Factors

The mandatory part of the second pillar (BVG minimum) is subject to tight regulations regarding minimum interest rates, minimum contributions' rates, and the conversion rate (Grazia Zito, 2011). Benefits and contributions in the first and second pillar have remained stable for a long time on the mandatory and supra-mandatory capital. Hence, parameters such as the conversion rate or the minimum interest rate were not adjusted to changes in market returns or demographic shifts until the year 2003. Only in that year, the minimum guaranteed interest rate has been adjusted and gradually lowered to 1.5 percent by 2012 (Grazia Zito, 2011). As the conversion rate depends mainly on the technical interest rate and average remaining life expectancy at age 65, major pension funds started to lower it on the supra-mandatory part in the beginning of the 21st decade (Aon Hewitt, 2012). New regulations including new accounting standards and higher transparency requirements regarding costs came into effect in 2004. Pension funds fear higher administrative costs due to new structural regulations (Credit Suisse, 2012b). Hence, under this aspect it is not surprising that the number of pension funds decreased from 4,285 in 1996 to 2,265 by the end of 2010 (Aon Hewitt, 2012).

With the first revision of the BVG, the conversion rate on the mandatory capital was lowered from 7.2 to 6.8 percent by 2014 (Table 5) (Stauffer, 2009). A further adjustment of the conversion rate to 6.4 percent in the mandatory part has already been approved by the Swiss parliament (Swiss Federal Council, 2011). However, a referendum provoked the Swiss voters to reject this new law by 73 percent (Tagesanzeiger, 2010).

Because politically set minimum standards are higher than actuarially appropriate, pension funds operating with great deal of BVG minimum capital are exposed to structural losses as they have to secure minimum pension benefits such as the minimum conversion rate (Aon Hewitt, 2012). While the appropriate conversion rate can be statistically determined, the conversion rate on the BVG mandatory capital is politically set, which has led to controversial political discussions. Pension funds are free to adapt alternative conversion rates on the supra-mandatory capital. This often results in a lowering of the benefits (i.e. conversion rate and minimum interest rate) on the supra-mandatory part in order to compensate minimum benefits on the mandatory capital required by law.

Table 5: Change in Conversion Rate

Year	Men	Women
2006	7.10 %	7.20 %
2008	7.05 %	7.10 %
2010	7.00 %	6.95 %
2012	6.90 %	6.85 %
After 2014	6.80 %	6.80 %

Source: Author based on Stauffer, 2009

Another structural change is observed in terms of pension scheme types. Between 2005 and 2011, defined-benefit (DB) schemes where retirees receive a fixed percentage of their previous earnings were more and more replaced with defined-contribution plans (DC) (Aon Hewitt, 2011). Whereas in 2005 35 percent of all pension funds offered DB plans covering 52 percent of members (and 65 percent DC plans covering 48 percent of affiliates), DB decreased to 19 percent in 2011, covering only 24 percent of affiliates (while DC increased to 81 percent covering 76 percent of affiliates) (Aon Hewitt, 2011). The trend towards DC plans shows the increased challenges to offer constant pension benefits to retirees under DB plans. Not only the financial crisis in 2008, but also the high volatility in financial markets show the increased desire of employers to possess higher control of the financial situation of their pension funds (Aon Hewitt, 2011).

The OECD stressed in its report on the Swiss pension system the unsuitability of politically determining a conversion rate (Swiss Federal Council, 2011).

4.4 Social Factors

Changing demographic circumstances and changes in the structure of a society create new requirements for an old age pension system and, thus, a capital based pension system (Ackermann et. al., 2008). Such changes are difficult to predict and hardly quantifiable. In order to analyze the possible effects of social changes on the pension schemes which hence generate new requirements, this section follows the model of Ackermann et. al., which assumes a high employment rate, a moderately increasing life expectancy, and robust capital markets.

Table 6: Major Trends and its Implications on Pension Funds

Topics	Trend	Actions for Pension Funds
Individuals and Society	• The desire for individual life plans increase • Society becomes more diverse	• Uniform pension scheme plans are challenged to offer more options
Family and Relationships	• Lifelong relationships less common (marriages per year decreased from 46,700 in 1970 to 40,000 in 2007 in Switzerland) • Work participation rate of women increases	• Align pension plans on single persons • Adjust pension plans for female works • Extend pension contributions on non-permanent workers
Work and Mobility	• Employees change employer more often • International labor competition increases	• Detach pension fund institution from employer
Health and Longevity	• Life expectancy constantly increasing • Retirees live more often in single households • Health costs increase constantly	• Flexibilize pension fund systems and offer various pension contribution options to employees • Create new pension products

Capital Market and Financial Knowledge	• Capital financed pension scheme increase in importance • Financial markets become more complex and greater knowledge will be required to understand • New financial products available	• Decrease solidarity / redistribution effects in second pillar • Implement better risk management and control instruments • Increase financial literacy among employees
Transparency and Simplicity	• Requirement for transparency increases • New information offers are created and information is better available	• Simplification of occupational pension fund system • Modernize information concepts regarding pension provision

Source: Author adapted from Ackermann, Walter and Lang, 2008

These trends show that a well-founded capital based pension system in Switzerland should be adapted to general society trends and an altered financial market environment in order to retain a sustainable pension system for the future. The above presented factors are not intended to be exhaustive, but should rather give the reader an overview of some major trends and their implications for a sustainably financed second pillar system for the next 30 to 40 years.

4.5 Life Expectancy

Life expectancy for the whole population is lower than the life expectancy of the working population. FSO calculates life expectancies for the whole Swiss population, which represent lower life expectancies than those who are working. It can be assumed that those who are going to retire at the age of 65 (or 64 for women) are in a better health state than those who already stopped working before the age of 65 (Swiss Federal Council, 2011). For pension funds, the relevant life expectancy are only those people aged 65 for men and 64 for women respectively that are working until the end of the retirement age, as pension funds are only liable for those people (including reversionary such as wives and children). Since the enactment of BVG in 1985, the average remaining life expectancy at the age of 65 increased four to five years until 2012 (Figure 21).

The University of Geneva published a report that investigated different life expectancies according to the type of work and education levels. They proofed that white-collar workers show a statistically significant higher life expectancy than blue-collar workers (Wanner and Lerch, 2012). Pension funds, however, do not take into account different life expectancies.

One of the most used data basis for projecting life expectancy are those from Pensionskasse Stadt Zürich (VZ) and BVG. Since the year 2000, the data basis is updated on a 5-year basis.
Most of the projections here, however, are based on the available data basis VZ 2005.

4.6 Models to Forecast Life Expectancy

In the past, pension funds used to work with period tables which reflect life expectancies for a future period at time 0. In order to account for the unpredictability of the future, Furrer and Welti (2005) advise to increase the present values of pension provisions of 0.4 to 0.5 percent per year. More sophisticated, but better forecasts give generation tables (Furrer and Welti, 2005). These incorporate different probabilities for mortality for every generation (generation = year of birth) for all ages. For instance, a woman born in 1950, at age 65 has a different life expectancy than a woman born in 1955 has at the same age 65. Up to the current year, those probabilities can be observed, those in the future predicted with models.

In order to forecast the remaining life expectancy at given ages, two models will be introduced which are the ones most commonly used by Swiss pension funds[8].
Jacques Menthonnex developed a model that incorporates mortality changes over time. These are based on the observed mortality data in Switzerland and forecasted with a logarithm functions including mortality probability of newborns, mortality risk dependent on time, mortality risk dependent on age, exponential acceleration of mortality risk dependent on increasing age:

$$q_x^J = q_x^{2012-x} * f(x,J)$$

x=age
J=year of birth
f(x,J) is a reduction factor, defined as f(x, 2012 - x) = 1

The FSO relies mainly on the model of Menthonnex for its forecasts of life expectancies. Although the model is well accepted, it carries weaknesses of a highly mathematical model, which is not easy to communicate, and it portrays the same trends, from the whole population to the insured employees in the pension funds (Furrer, 2005).

Padrot Nolfi developed a half-life model after which an exponential longevity trend is projected in mortality rates. The development of mortality thus follows a negative exponential function (Gisler, 2010):

$$q(x,t) = q(x,0) * e^{-\frac{ln(2)}{T(x)} * t}$$

q (x,0) mortality rate at time x for age y
t time since observation
T(x) half-life

This model is relatively easy to comprehend and communicable. The major downside is that predicted long-term social factors cannot be build into the model.

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[8] For this work, the data basis of VZ 2005 was available in full. VZ incorporated more sophisticated options such as the introduction of a further mortality model named after Nolfi in 2010, which will be introduced here, but only used partially in the subsequent calculations.

Figure 21: Average Remaining Life Expectancy at Age 65
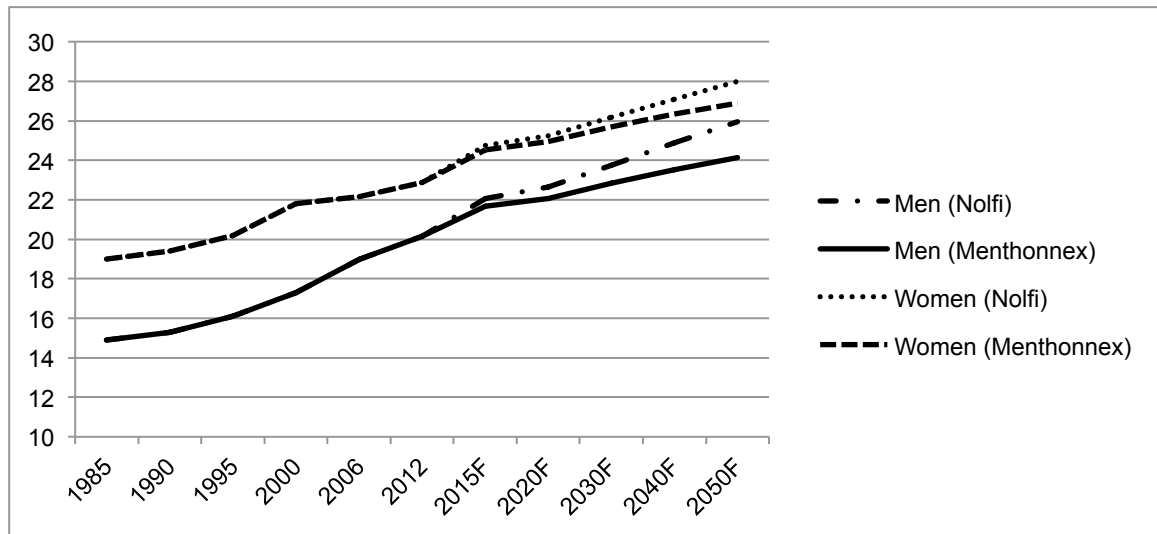
Source: Author based on FSO, VZ 2000, VZ 2005, VZ 2010

The average remaining life expectancy at age 65 has increased enormously in the last 30 years, and even more than expected by experts (Swiss Federal Council, 2011). Especially the life expectancies for men have increased and are diverging towards the values of women. While it can be observed that the two presented models result in different forecasts, the underlying trend of increasing life expectancies for both men and women not only at birth, but also at the age of 65, is clearly visible.

When the first employees of our sample group retire in 2040 at age 65 (year of birth 1975), the average life expectancy is seven to ten years longer than in 1985. This means tremendous changes in the requirements for old age pension systems.

4.7 Implications for Swiss Pension Funds

Not accounting for higher life expectancy leads to a longer pension period than calculated with the current conversion rate.

While the first pillar of the Swiss three-pillar system was designed to ensure solidarity between high and low incomes and young and old, the second pillar was not designed to create redistributions between high and low incomes nor between employees and retirees (i.e. between young and old) (Swiss Federal Council, 2011).

The minimum conversion rate is not only politically a sensitive issue, but also for the pension funds. Surveyed pension funds in the Credit Suisse report in 2012 state that the increasing redistribution within the pension fund or the increased solidarity will be the greatest political challenge (Credit Suisse, 2012b). If the returns achieved on the capital market are not at least as high as the technical interest rate with which the pension liabilities are valued, then the pension funds are underestimating the current pension liabilities (Credit Suisse, 2012b).

Figure 22: Solidarity in the Second Pillar
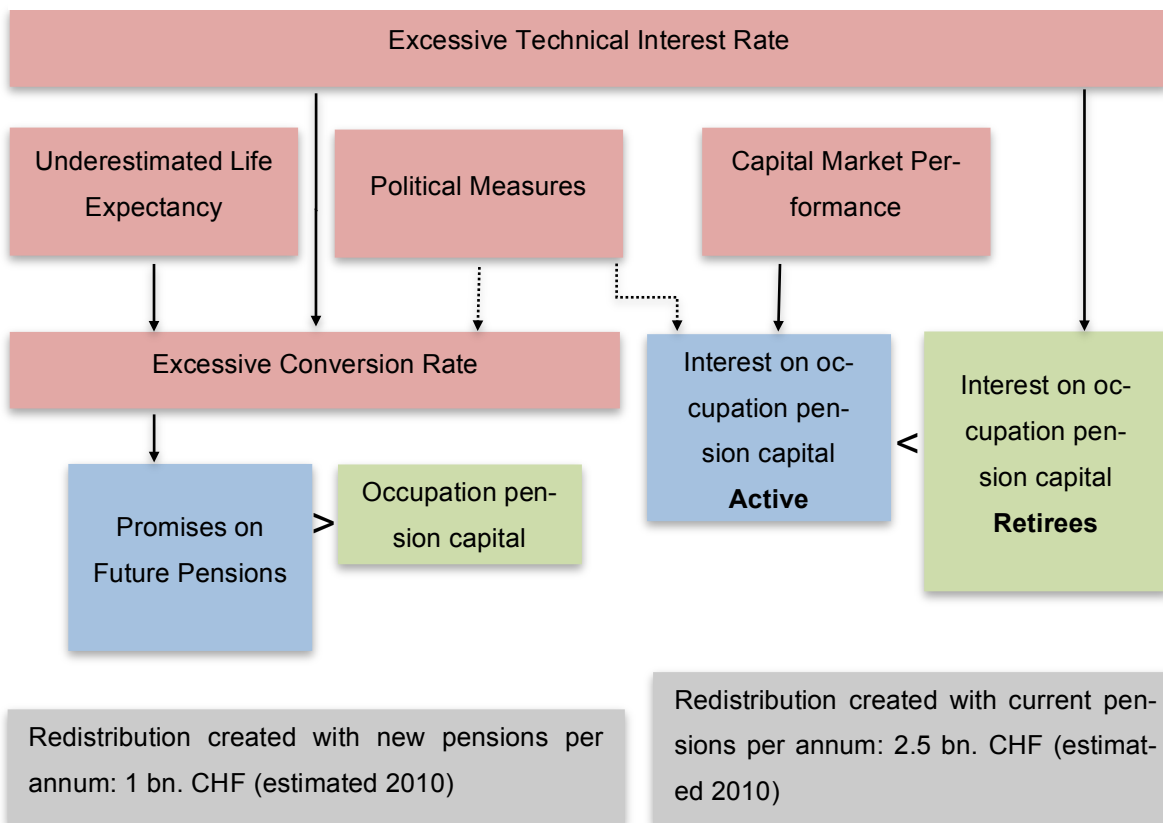
Source: Author based on Credit Suisse, 2012b

Due to this and due to the fact that current pensions cannot be changed, pension funds redistribute capital from actively insured employees to retirees. The current situation violates the concept of having a fully capital based second pillar. Figure 22 illustrates the redistribution situation the second pillar faces.

4.7.1 Redistribution with New Pensions

If a pension fund applies conversion rates that are too high for future expected long term average capital returns and if it underestimates the life expectancy for people entering retirement, the calculated pensions will be too high, and hence, at the time of retirement, a funding gap results (Credit Suisse, 2012b). This funding gap (Figure 22) is the result of the discounted difference between the promises on future pensions and the actuarial appropriate pension at the time of retirement. Pension funds set up a provision for such a funding gap, but it is borne by the actively insured contributors. The redistribution costs of new pensions are estimated between 600 million CHF (Swiss Federal Council, 2011) and 1 bn. CHF per year (Credit Suisse, 2012b), depending on the method of calculation[9]. Even pension

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[9] Assuming an average occupation pension capital of CHF 300,000 that is converted to an annuity pension with a conversion rate that is above the actuarial appropriate rate of 6.4 percent (as an example only) would result in the following: CHF 300,000 * (6.8 / 6.4) = CHF 318,750. A provision of 20,000 CHF have to be set up (=funding gap). Currently, 30,000 people enter retirement per year (this figure is higher than the figure presented in chap-

funds that insure supra-mandatory benefits (and would thus be more flexible to adjust the conversion rate on the supra-mandatory capital) voluntarily use an excessive conversion rate (Credit Suisse, 2012b). The Swiss Pension Fund Survey 2011 from Aon Hewitt reveals that current conversion rates including the supra-mandatory part lie between 6 and 7.2 percent[10]. As long as excessive conversion rates are not (or cannot politically) adjusted, the funding gap or retirement loss will incur every year.

4.7.2 Redistribution with Current Pensions

If the technical interest rate is too high in regards to the average achievable long-term capital returns, the interest on the retirement capital of retirees will be higher than the interest on the occupational capital of the actively insured employees (Credit Suisse, 2012b). While the actively insured employees bear the investment risk (hence receive lower interest on the occupational capital), pensions of retirees benefit from high technical interest rates. Furthermore, the granted pensions are life-long annuities which can hardly be adapted (Credit Suisse, 2012b). Extrapolated from a survey conducted by Credit Suisse, over all Swiss pension funds, it is estimated to reach a redistribution amount of CHF 2.5 bn. per year. Although this amount is subject to capital returns that may differ from year to year, it gives a good indication.

In total, CHF 3.5 bn. or 0.6 percent of total pension funds assets or 9.5 percent of yearly contributions (total contributions in year 2010 were CHF 37 bn.) are redistributed per year (Credit Suisse, 2012b).

There are, however, measures pension funds can take in the future in order to absorb such redistributions at least partially. For instance, they have the option not to grant inflation compensations in the future on current pensions.

Aon Hewitt (2012) assesses the question of redistributions between young and old generations as very important: "the system was never designed to incorporate solidarity". This issue is regarded as highly sensitive, as the system's stability depends on the younger generation's trust in the system.

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ter 3.3 as non-regular retirees such as widow or invalidity pensions are counted too here). 30,000 * CHF 20,000 = CHF 600 million per year. The lower the assumed actuarial appropriate conversion rate and the higher the average occupational pension capital, the higher the calculated redistribution costs.

[10] This survey included pension funds representing CHF 297 billion of pension fund capital and 1.2 million insured employees.

4.8   Implications on Pensions for Generation Born 1975-1985

In this analysis, the individual method for the calculation for various scenarios is being used in order to estimate future conversion rates as accurate as possible. The model is constructed in MS Excel and its parameters are adjusted for retirement ages of both men and women of 65[11]. Due to the use of the individual method, the corresponding probabilities for being married at the age of 65 for every year of birth between 1975 and 1985 are used based on the data basis of VZ 2005 (Furrer and Welti, 2005). Furthermore, it takes into account the average age difference between men and women for a man or woman that is married at the age of 65, and the average number of children aged below 65. According to the defined BVG minimum benefits the present values of the following factors are calculated as follows:

Present Value:

$$\ddot{a} = (\ddot{a}^{(m)}_x + 0.6\, \alpha^w_x - 0.6\, \ddot{a}^{(m)}_x \alpha^w_x) + 0.2\, \alpha^k_x + 0.2\, \alpha^{ap}_{x(s-x)}$$

$\ddot{a}^{(m)}_x$ Present value of current pension (beneficiary)

$\alpha_{x/y}$ Present value of pension of surviving spouse

α^k_x Present value of pension of orphan

$\alpha^{ap}_{x(s-x)}$ Present value of old age child pension

$$Conversion\ Rate = \frac{1}{\ddot{a}} = \frac{1}{Present\ Value}$$

A widow receives 60 percent of the old age pension the insured person received. The corresponding formula calculates the value as follows: A man receives 100 percent of an old age pension and his wife 60 percent. However, as long as both live, the widow's benefit part is subtracted again ($\ddot{a}^{(m)}_x + 0.6\, \alpha^w_x - 0.6\, \ddot{a}^{(m)}_x \alpha^w_x$). The weight of the present value results from the probability that a man or woman is married at the age of 65. Moreover, it is assumed that neither marriages nor divorces occur after the time of retirement. Those principles work the same for women. Present values for children or orphan pensions aged below 25 at the time of retirement are calculated using the corresponding probabilities at the age of 65 to have a child and their ages. Although those values are almost negligible, they are used to complete the model.

Present value of current pension (beneficiary):

$$\ddot{a}^{(m)}_x = \frac{N_x}{D_x} - \frac{m-1}{2m}$$

$$v^n = \frac{1}{(1+i)^n}$$

$$lx_1 = lx * (1 - q_x)$$

$$D_x = v^{x-17} * l_x$$

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[11] due to recent harmonization initiatives in the second pillar, an increase of the retirement age for women to the age 65 can be expected

$$N_x = D_x + D_{x+1} + \cdots$$

m= number of payments per year
i= technical interest rate (TZ)
q= average mortality probability for each year of life
l_x= surviving population in year x (based on starting population 100,000 at age 17) according to average mortality probability for each year of life
D_x= accumulated factor for surviving population and discount rate for each year of life
N_x= sum of accumulated factor for surviving population and discount rate for each year of life

Present value of pension of surviving spouse:

$$\alpha_{x/y} = \frac{N^w_{x/y}}{D_x l_y}$$

$$D^w_{x/y} = v^{\bar{x}+0.5} l_x q_x l_{y+0.5} \ddot{a}^{w(m)}_{y+0.5}$$

$$N^w_{x/y} = D^w_{x/y} + D^w_{x+1/y+1}$$

q= average mortality probability for each year of life
l_{xy}= surviving population in year x (based on starting population 100,000 at age 17) according to average mortality probability for each year of life with an average age difference of 3 years between men and women (x-y=3)
$D^w_{x/y}$= joint accumulated factor for surviving population and discount rate for each year of life
$N^w_{x/y}$= joint sum of accumulated factor for surviving population and discount rate for each year of life

Present value of pension of orphan:

$$\alpha^k_x = \frac{N^k_x}{D_x}$$

$$D^k_x = v^{\bar{x}+0.5} l_x q_x k_{x+0.5} \ddot{a}^{(m)}_{\overline{25-z_{x+0.5}|}}$$

$$N^k_x = D^k_x + D^k_{x+1} + \cdots$$

q_x= average mortality probability for each year of life
k_x= average number of children aged below 25
z_x= average age of children aged below 25
D^k_x= accumulated factor for children aged below 25 and discount rate for each year of life
N^k_x= sum of accumulated factor for children aged below 25 and discount rate for each year of life

Present value of old age child pension:

$$\alpha^{ap}_{x(s-x)} = k_s \frac{D^a_s}{D^a_x} \ddot{a}^{(m)}_{\overline{s:25-z_s|}}$$

$$\ddot{a}^{(m)}_{\overline{s:25-z_s|}} = \ddot{a}^{(m)}_s - \frac{D_{s+25-z_s}}{D_s} \ddot{a}^{(m)}_{s+25-z_s}$$

q_x = average mortality probability for each year of life
$\ddot{a}^{(m)}_s$= present value of beneficiaries' pension (see above $\ddot{a}^{(m)}_x$)

s= age of retiree (here 65)

All figures are real values, as they work better for comparisons between values today and of the future, and no assumptions have to be made on future inflation.

The salary calculations are based on average salaries based on collected salary data according to various complexity levels of jobs by FSO (Table 10). As the effect on mandatory benefits of pension funds can be better measured, salaries according to the lowest complexity levels (mainly jobs with repetitive tasks) and the second highest complexity levels are taken as sample groups each for men and women. According to those salary categories, individual annual salary developments can be observed and median annual salary developments can be projected until the age of 65, based on real figures. AHV old age pensions are neglected.

According to the projections with increasing life expectancies based on VZ 2005, realistic conversion rates are 6 percent and lower, depending on the assumed technical interest rate (Figure 23).

Figure 23: Prediction Conversion Rate Development
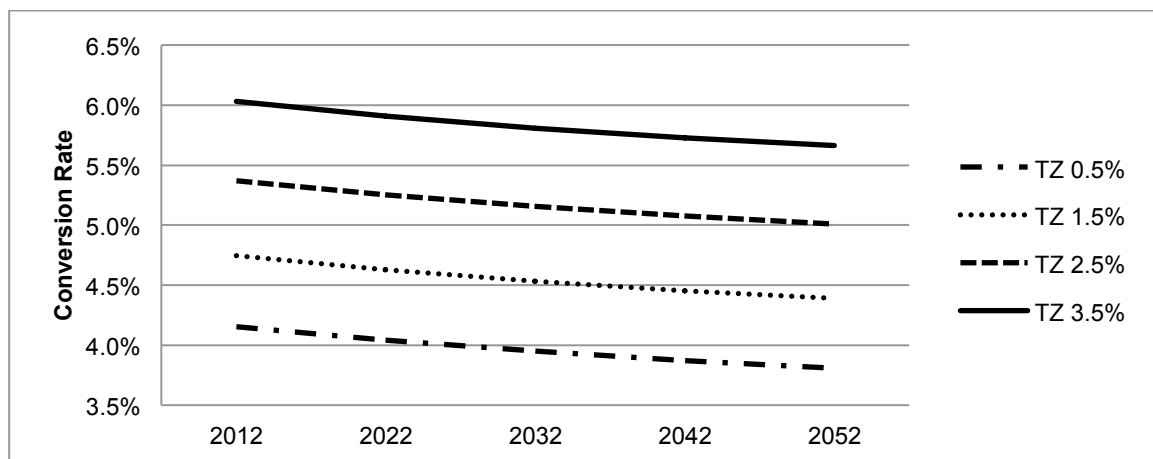
Source: Author based on data VZ 2005 (Furrer and Welti, 2005)

Three different interest rate scenarios are presented for each generation. The interest rate granted on the accumulated old-age capital is assumed to be equal to the technical interest rate. If a man born in 1976 started his career at the age of 25, pursuing a job with difficulty level of 2, and statistically earned a median salary of CHF 52,300 per year, on average, a real salary increase for this level of job is statistically of 0.55 percent per year, which results in an annual salary of CHF 65,131 at the age of 65 (Table 10). Assuming a technical interest rate and an interest rate on old-age capital of 2.5 percent, a conversion rate of 5.08 percent in 2041 is forecasted. This means a 26.4 percent reduction of the conversion rate compared to 2012. Table 6 to 9 illustrate expected changes in income for two sample groups, born 1976 and 1985, for both men and women. In the appendices, chapter 12.5, further sample groups are presented. The purpose of presenting these two sample groups here is to illustrate the effect of longevity and different interest rate scenarios on future pension incomes. It shall give a rough overview of what can be expected based on mathematical and statistical information only (neglecting political set benefits in the second pillar).

Table 7: Income Gap Calculation 1976 Men

Gender	M					
Year of Birth	1976					
Year of Retirement	2041					
Technical Interest Rate	1.5%		2.5%		3.5%	
Minimum Interest Rate	1.5%		2.5%		3.5%	
Income at age 25 (Start Income)	52,300	65,400	52,300	65,400	52,300	65,400
Income at age 65 (End income)	65,131	104,147	65,131	104,147	65,131	104,147
Average real salary increase p.a.*	0.55%	1.17%	0.55%	1.17%	0.55%	1.17%
Accumulated capital in 2nd pillar	232,105	406,254	275,384	477,758	330,261	567,790
Remaining Life Expectancy in 2041	23.59					
Conversion Rate 2012	6.90%					
Conversion Rate 2041**	4.46%		5.08%		5.73%	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	1,335	2,336	1,583	2,747	1,899	3,265
Pension Income 2041 with new Conversion Rate (2nd pillar)**	863	1,510	1,166	2,022	1,577	2,712
Difference in Pension Income (2041 – 2012)**	(467) -35.4%	(826) -35.4%	(418) -26.4%	(725) -26.4%	(322) -16.9%	(553) -16.9%

* based on FSO, 2008b (see table 10)

** based on author's model

Table 8: Income Gap Calculation 1976 Women

Gender	F					
Year of Birth	1976					
Year of Retirement	2041					
Technical Interest Rate	1.5%		2.5%		3.5%	
Minimum Interest Rate	1.5%		2.5%		3.5%	
Income at age 25 (Start Income)	47,300	63,700	47,300	63,700	47,300	63,700
Income at age 65 (End income)	53,321	90,795	53,321	90,795	53,321	90,795
Average real salary increase p.a.*	0.30%	0.89%	0.30%	0.89%	0.30%	0.89%
Accumulated capital in 2nd pillar	174,890	356,814	208,453	421,423	251,159	503,056
Remaining Life Expectancy in 2041	26.39					
Conversion Rate 2012	6.85%					
Conversion Rate 2041**	4.62%		5.23%		5.89%	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	998	2,037	1,190	2,406	1,434	2,872
Pension Income 2041 with new Conversion Rate (2nd pillar)**	673	1,373	909	1,838	1,232	2,468

Difference in Retirement Income (2041 – 2012)**	(326)	(664)	(281)	(567)	(202)	(404)
	-32.6%	-32.6%	-23.6%	-23.6%	-14.1%	-14.1%

* based on FSO, 2008b (see table 10)

** based on author's model

Table 9: Income Gap Calculation 1985 Men

Gender	M					
Year of Birth	1985					
Year of Retirement	2050					
Technical Interest Rate	1.5%		2.5%		3.5%	
Minimum Interest Rate	1.5%		2.5%		3.5%	
Income at age 25 (Start Income)	52,300	65,400	52,300	65,400	52,300	65,400
Income at age 65 (End income)	65,131	104,147	65,131	104,147	65,131	104,147
Average real salary increase p.a.*	0.55%	1.17%	0.55%	1.17%	0.55%	1.17%
Accumulated capital in 2nd pillar	232,105	406,254	275,384	477,758	330,261	567,790
Remaining Life Expectancy in 2041	24.13					
Conversion Rate 2012	6.90%					
Conversion Rate 2050**	4.39%		5.01%		5.66%	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	1,335	2,336	1,583	2,747	1,899	3,265
Pension Income 2041 with new Conversion Rate (2nd pillar)**	850	1,487	1,150	1,995	1,559	2,680
Difference in Retirement Income (2050– 2012)**	(485)	(849)	(433)	(745)	(340)	(585)
	-36.3%	-36.3%	-27.4%	-27.4%	-17.9%	-17.9%

* based on FSO, 2008b (see table 10)

** based on author's model

Table 10: Income Gap Calculation 1985 Women

Gender	F					
Year of Birth	1985					
Year of Retirement	2050					
Technical Interest Rate	1.5%		2.5%		3.5%	
Minimum Interest Rate	1.5%		2.5%		3.5%	
Income at age 25 (Start Income)	47,300	63,700	47,300	63,700	47,300	63,700
Income at age 65 (End income)	53,321	90,795	53,321	90,795	53,321	90,795
Average real salary increase p.a.*	0.30%	0.89%	0.30%	0.89%	0.30%	0.89%
Accumulated capital in 2nd pillar	174,890	356,814	208,453	421,423	251,159	503,056
Remaining Life Expectancy in 2050	26.88					
Conversion Rate 2012	6.85%					

Conversion Rate 2050**	4.55%		5.17%		5.82%	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	998	2,037	1,190	2,406	1,434	2,872
Pension Income 2041 with new Conversion Rate (2nd pillar)**	663	1,352	897	1,814	1,218	2,439
Difference in Retirement Income (2050 – 2012)**	(335) -33.6%	(684) -33.6%	(292) -24.6%	(591) -24.6%	(216) -15.1%	(433) -15.1%

* based on FSO, 2008b (see table 10)

** based on author's model

Table 11: Real Salary Increases according to Complexity of Job

Complexity level (1 very complex tasks, 4 repetitive simple tasks)	Median salary at age 25 Men	Real salary increase p.a. Men	Median salary at age 25 Women	Real salary increase p.a. Women
4	**CHF 52,296**	**0.55%**	**CHF 47,304**	**0.30%**
3	CHF 58,728	0.77%	CHF 55,428	0.67%
2	**CHF 65,400**	**1.17%**	**CHF 63,696**	**0.89%**
1	CHF 77,904	1.67%	CHF 73,140	1.24%

Source: Author's calculations based on FSO, 2008b

Currently, the majority of pension funds state that a conversion rate on the mandatory capital BVG should be between 6.2 and 6.4 percent today (Aon Hewitt, 2012). Furthermore, if parameters such as retirement age or contribution rates will not be adjusted, the industry expects higher pressure in the future on the conversion rate (Aon Hewitt, 2012)

A reduction in the conversion rate could motivate retirees to choose obtaining their pension capital in full as a lump sum instead of taking a life-long annuity in form of a pension (Grazia Zito, 2011). Grazia Zito has empirically proven that retirees tend to choose the capital lump sum option more often when the conversion rate is lowered. The challenge of managing a life-long income from the received lump sum shall not be underestimated, as retirees have to deal with the challenges of a low interest rate environment (and a volatile capital market) and increased life expectancy by themselves.

5 Empirical Analysis with Experts and Non-Experts

The empirical analysis is based on 40 qualitative interviews, which were conducted with experts and non-experts. Among the interviewees were 23 experts from pension funds, insurances, pension fund consultancies, economists, asset managers, the oversight committee of the occupational pension funds (OAK BV), and the Federal Social Insurance Office. In order to incorporate the view of the generation born between 1975 and 1985, 17 individual insured workers aged between 27 and 37 were interviewed too. The concept of the 1 hour expert interviews followed the subsequent structure: assessment of the current (financial) situation of pension funds, expected changes, preparedness of pension funds in regards to expected changes, the view of individuals, recommendations for pension funds, politicians and individuals aged between 27 and 37. Non-expert interviews focused on the individual knowledge and trust in pension funds, their expectations regarding the social security system and pension funds, and their readiness to change their behavior. Detailed interview guidelines and a list of interview partners can be found in the appendices in chapters 11.1. to 11.4.

After outlining the challenges pension funds are facing today and in the next 30 years, possible new realities for future retirees born between 1975 and 1985 will be described. Based on that overview, recommendations are worked out as to how to adjust the second pillar of the social security system in Switzerland in order to maintain the pension model for the next 30 year. Recommendations will be given to employees in order that they can prepare for the altered environment and to plan a wealthy retirement.

The empirical analysis is presented with views from experts and individuals, and, where appropriate, with a brief view on literature. Reference will be taken to the theoretical analysis of part 4 in this paper.

The Federal Constitution of the Swiss Confederation according to article 113 legislates the occupational pension schemes. It defines the following:

> The occupational pension scheme, together with the Old-age, Survivors' and Invalidity Insurance, enables the insured person to maintain his or her previous lifestyle in an appropriate manner.

Although the maintenance of the previous life-style is often defined as a 60 percent quote of the last salary, no specific quote is defined in the constitution (Swiss Federal Council, 2011). Since 60 percent of an annual salary below CHF 70,000 might fail to accomplish this goal, 60 percent of a salary above CHF 120,000 might be exaggerated.

The defined performance goal in the constitution is important to consider as proposed solutions will have to be politically compatible with the constitutional goal.

5.1 Introduction

The presented problematic of insufficiently financed pension provisions is illustrated in figure 24. If benefit promises are too high and if not enough capital is accumulated, the annuity payments exceed the discounted pension liability, and inevitably, money is transferred from active employees to retirees.

⇒ Poor knowledge of individuals regarding pension funds

⇒ Average level of trust of individuals

⇒ Young people are generally aware of challenges in second pillar

Figure 24: Old Age Capital Insufficient for Lifelong Annuity
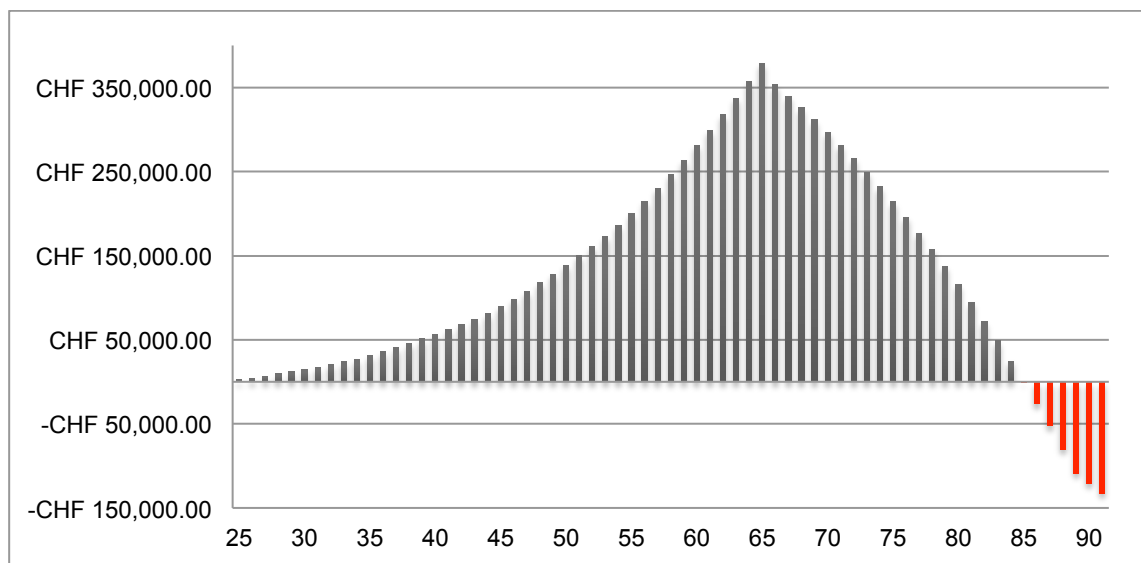
Source: Author

5.1.1 Expert view

All experts generally agree that Switzerland established a well structured and financed pension system. Many mention the combination of several pillars as a unique feature with a pay-as-you-go element and a capital based pillar that diversifies not only economic but also political risks. Some also highlight the fact that occupational pension plans are independent legal entities and, as such, are separated legally from their companies. Moreover, the system successfully eliminated old age poverty and enhanced to some extend self-responsibility through the third pillar. Although the Swiss three-pillar-system is internationally recognized, it was stressed by all interviewed experts that effective measures are needed in order to keep a sustainably financed old age pension system for the future.

5.1.2 Individual view

The interviewed individuals born between 1975 and 1985 with different education and income levels, have an average trust in the AHV (median value 4, scale 1-6) and a somewhat

higher trust in their pension fund (median value 4.5). The score of trust in the AHV increases if a less guaranteed benefit level is assumed. 12 percent of all asked individuals stated they fully confide in their pension funds, and 76 percent confide on an average level (4-5). A survey conducted in 2011 with a greater scope of individuals revealed a similar picture: 31 percent stated they fully trust their pension fund and 41 percent confide predominantly (ASIP, 2011).

The knowledge of individuals is, however, on a rather low level: the majority of all interviewees stated their knowledge regarding their pension plans and the general functionality of the three-pillar-system is very low (median value 2, scale 1-6). Only 60 percent knew what is meant by the minimum interest rate and only 35 percent could correctly explain what a conversion rate is. More representative studies show a similar picture regarding the knowledge of individuals (AXA, 2012)[12]: 25 percent of all interviewed individuals stated that they do not know at which pension fund they are insured. One third did not know how much old-age capital they have saved.

Many explained their lack of knowledge due to the long time horizon until those questions will become relevant for them. Some mentioned complexity as a reason why they did not understand more of the interrelations of the pension funds.

Many issues concerning occupational pension funds were heard of in newspapers. Although individuals aged between 27 and 37 generally do not understand the interrelations between their contributions and the solidarity aspect they feel, the promised benefit levels are likely to decrease until their retirement between 5 and 40 percent (median value 13 percent). Only a minority thinks they will receive the same benefits as the generation today. Whether or not they save consciously due to current issues in the second pillar, the majority makes a contribution to a bank account in the third pillar (saving account pillar 3a) at minimum every second year. Almost everybody who did not yet have a 3a saving account stated they will start to contribute in the next 1 to 2 years. This result is remarkable, as the median age of all interviewees was 31. Calculations presented in part 4.8 show a clear trend regarding a change in conversion rate and eventually a lower pension income from the second pillar. Under the assumption of constant interest rates and a constantly increasing life expectancy according to Menthonnex and statistical data VZ 2005, pensions under a fair market value will be between 14 and 36 percent lower in 2040 than in 2012 without any other political measures being taken.

It seems that individuals have a certain awareness of financial tenseness in the system and make some preparations such as saving in their third pillar saving account.

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[12] AXA asked 1004 individuals in Switzerland in 2011.

5.2 Current Challenges

⇒ Financial situation of pension funds worse than reported

⇒ Main challenges: capital market, solidarity, political risks, demographic ageing

⇒ Retaining benefit level expensive

5.2.1 Expert view

In general, the interviewed experts assess the current situation of pension funds as stressed but not severe assessed by the current funding ratios. There is, however, a big gap between public and private pension funds and between pension funds in the French and German speaking part of Switzerland. Public institutions show on average a much lower funding ratio than private pension funds. Most of the experts criticize the methodology of calculating and comparing coverage ratios. As the funding ratio is highly influenced by the underlying technical interest rate set by them, pension funds should not be homogenously compared by their funding ratio, as they may show a too optimistic picture of their provisions in relation to their assets. All experts are convinced that using lower and more realistic technical interest rates would show many pension funds in a much worse situation. Opinions on an accurate technical interest rate vary from 0.5 percent (which is basically the risk free interest yield on a 10-year Swiss confederation bond) to 3 percent (with the rationale of a long-term average of various investment classes). The median value of all interviewed experts is 2.25 percent, and hence, more than 1 percent lower than the actual used technical interest rate on average (see chapter 5.2.3). It was mentioned that the most likely reason for why pension funds did not adjust their technical interest rate are the high costs associated with such a change. Indeed, experts estimate a reduction of the technical interest rate of 1 percent to cost approximately 10 percent of pension funds liabilities due to a lower discounting effect.

The challenges the experts mentioned most frequently were a challenging capital market environment with low interest rates followed by the challenge of retaining the promised benefit level. Political risks were the third most frequently mentioned risk for the future of the second pillar, as many experts fear slow adjustments of politically set parameters and reality. Many experts regard the promised benefits that are politically guaranteed such as the conversion rate as a big challenge for the future, as the second pillar was obliged to introduce a pay-as-you-go component. To reach a political consensus among all parties is expected to be a difficult challenge. While pension funds with supra-mandatory benefits have the possibility to compensate the required minimum benefits on the mandatory part, pension funds that insure employees with salaries in the mandatory part are those who have no scope of action and are urged to redistribute money from active working population to inactive retirees.

Some state that the time to find appropriate solutions is scarce, but that solutions are needed urgently.

Political challenges are probably the most important to address. Solutions can only be achieved in the shade of still accomplishing the constitutional goal, which requires enabling the insured person to maintain his or her previous lifestyle in an appropriate manner. Hence, a technical reduction in minimal benefits must not violate the constitutional goal.

5.2.2   Individual view

The previously presented results reveal that young people are aware of the difficulties in maintaining the promised benefit levels of the first and second pillar. Most frequently, young people are concerned with whether the current benefit level within the first pillar can be preserved due to the demographic shift and an increased dependency ratio. For the second pillar, most interviewees state the required returns are the biggest challenge for pension funds. If young people were asked, what do they think will influence their pension income, the picture looks different: the vast majority is aware that income and contribution period are major drivers to determine their pension income once they retire, but the vast majority is not aware of how capital returns affect their old age capital and, eventually, their pension income.

The interviews further revealed the complexity of the Swiss social security system. Most concerning was that nobody understood the connection between a too high conversion rate and the solidarity component in the second pillar. Nobody was aware of the implications of the vote in 2010 regarding the conversion rate.

5.2.3   Literature

A broader survey conducted by Credit Suisse reveals a similar picture to the expert responses: the main challenges pension funds are facing are a long-lasting low-interest rate environment, followed by the current European debt crisis, demographic ageing, and a too high conversion rate (Credit Suisse, 2012b).

The current asset-weighted funding ratios of public pension funds are as low as 88.6 percent, and those of private funds 103 percent. These observations are based on a median underlying technical interest rate (TZ) for public DC pension funds of 3.41 percent and those of private funds of 3.24 percent (Swisscanto, 2012)[13]. Lowering the TZ (as required by interviewed experts) would result in much lower funding ratios). The Swiss chamber of pension fund experts indorsed a policy effective from 1 January 2012 that governs the determination of an appropriate TZ as follows (Swiss Federal Council, 2011):

- 20-years average performance of Pictet BVG-25 plus index (weighted by two-thirds)
- average yield of a 10-years Swiss confederation bond (weighted by one third)

The result has to be lowered by 0.5 percent and to be rounded down on a 0.25 percentage basis.[14]

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[13] In the survey of Swisscanto, all pension fund institutions, including insurances, are included. Excluding insurances would lower the median value as they are under a tighter regulation than autonomous pension funds.
[14] TZ must not fall below the yield of a 10-years Swiss confederation bond and must not exceed 4.5 percent (according to the calculation of the Swiss chamber of pension fund experts, TZ was 3.5 percent in 2011).

5.3 Expectations

⇒ Key question is how to maintain benefit level

⇒ Benefit cuts not desired by general public and politicians

⇒ Young people ready to react and make their contributions

5.3.1 Expert view

Expectations regarding financial returns for the next five to ten years are rather pessimistic and a high uncertainty is associated with it. In fact, most interviewed pension fund managers, asset managers and other experts predict a low interest rate environment for the next five to ten years to come. Some do even mention the likelihood of a Japanese scenario for the future.

Opinions regarding the further development of life expectancy are similar: all experts expect a further increase in life expectancy for men and women. There is, however, a division of opinions whether this trend will further accelerate or flatten.

Although some experts are convinced that some politicians understand the urgency to act in order to sustainably finance the occupational pension system, they also fear that politicians are not willing to take any long-term measures that would make them unpopular. The voice of the insurance criticizes the unequal regulations for autonomous pension funds and insurances, which hinders an effective competition.

All experts see the current benefit level of pensions of the second pillar under pressure. There is a general agreement that the current benefit level is expensive to maintain. An important remark is that the underlying requirement for sustaining welfare, and, thus, pension benefits, is economic growth. Experts are convinced the current benefit promises cannot be financed with the current parameters; the question is whether it is desired to adjust parameters such as increasing retirement age or increasing contributions, or to leave the current parameters and decrease the benefit level. The current situation seems unsatisfactory, as current benefit promises are too high, and, in order to finance them, money is transferred from the active working population to retirees.

5.3.2 Individual view

Individuals expect from their pension funds that they will keep their promises and inform them in a transparently and understandable language. Securing their capital seems to be the most important criteria for individual employees. Furthermore, individuals value a good interest rate and long-term sustainable and ethical investments. They further demand efficiency improvements such as lowering administrative costs. A study from AXA (2012) shows similar results: 90 percent of all asked Swiss employees stated securing their capital as the most important criteria. 71 percent value a high interest rate. Moreover, good understandably material and transparency were also highly valued criteria.

5.4 New Reality

⇒ Future generations have to expect to work longer and to contribute more

⇒ Second pillar capital based, but 10 percent of contributions are used to finance current pensions

⇒ More self responsibility exhibited of younger generations

5.4.1 Expert view

Experts anticipate that future retirees have to expect to work longer, and to accept less secured pension income. A possible model could go into the direction of defining a fixed proportion of a pension and a variable part that is linked to current market performance. Moreover, most of the experts predict that pensions will not be adjusted to inflation in the years to come under these circumstances. This is a crucial point, as this means a benefit reduction in real terms.

Steadily increasing life expectancy coupled with a low interest rate environment and high promised benefits created a situation where benefit provisions are higher than the accumulated old-age capital (if only looking at the increases in life expectancy of around 5 years since introduction of the BVG in 1985 at age 65, then one has to realize that retirement ages for men at 65 and women at 64 were - with the exception of equalizing the retirement age of women – never adapted). Experts point out the fact that calculations should be based on realistic factors.

In the last years, there has been a pay-as-you-go element introduced into the system. According to estimates of interviewed experts, those transfer payments are around CHF 1 bn.. In other words, 10 percent of current contributions to the second pillar are transferred to current occupational pensions (i.e. retirees) (Swisscanto, 2010). This solidarity is illustrated in figure 25, where the red arrow represents the transfer payments of the active working population to the retirees in order to maintain the current conversion rate (illustrated as a pipe). As the life expectancy since the introduction of the BVG in 1985 increased by almost 5 years but the BVG pension benefits only decreased marginally, one could conclude that pension models are 5 years behind of the current reality.

Experts are highly concerned that the system was designed for every generation to save for themselves in a capital accumulation system, but now has elements of transfer payments between the active working population and retirees. They further point out that this solidarity is not visible to the younger generations and may present a risk in the future, as overstraining solidarity might lower the trust in the second pillar. Experts warn that the problem is likely to be postponed, and the price to fix it will increase the longer it takes to take corrective measures.

Figure 25: Solidarity
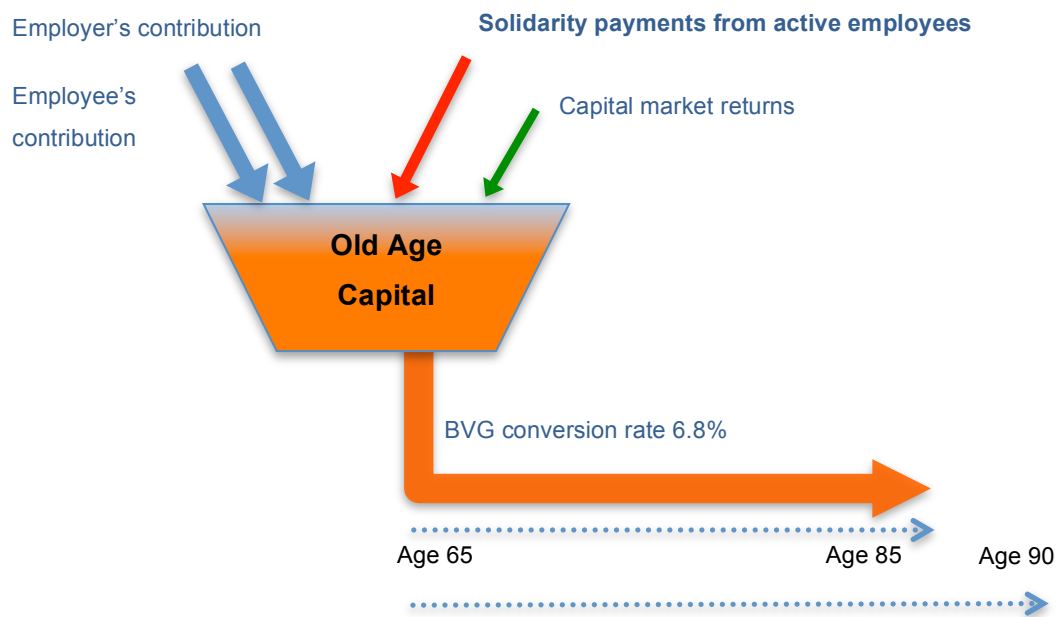
Source: Author

Another important question to ask is what are the consequences – if nothing changes the next years – for all institutions within the second pillar. Experts agree that the next 5 to 10 years, there might be no big impact visible. The tendency of compensating the required minimum benefits with the supra-mandatory capital will increase and pension funds insuring employees below the maximum mandatory level will have to increase their pay-as-you-go element.

The consolidation of pension funds is expected to continue as structural reforms and increased complexity creates an ever-demanding market environment. The voice of the insurers highlights the fact that increasing regulations might push market participants out of the market.

Experts also mention that individuals should be encouraged to increase their self-responsibility as the reality has changed.

It is clear that adequate measures have to be taken in order to sustainably finance the occupational pension system. The question is which measures are applicable in practice and which measures are politically acceptable. Moreover, individuals, employers, and politicians should be prepared for changes and be willing to take the necessary measures.

5.4.2   Individual view

Young individuals are aware of the increasing life expectancy and the difficult market environment. They are, however, not fully aware of its magnitude and its implications on pensions funds. Most of the interviewed individuals are ready to make their contribution. They were asked whether they are ready to contribute more, work longer, or accept lower pension income (Figure 26). The vast majority prefers to contribute more in order to receive the same benefits at the age of 65 over working longer or receiving less pension income. 88 percent of all interviewees prefer to contribute more with a median value of 1.5 percent higher salary contributions. On average, interviewed individuals today pay contributions of 3.5 percent, and they are ready to contribute up to 5 percent of their salary to their pension fund if they can be sure to receive the same pension income retirees get today. Working longer is an option for most young adults, too. However, it depends on the type of work they do. For all that stated working longer in order to receive the same pension resulted a median age of retirement age of 67.9 between 2040 and 2050. Receiving less pension income at a retirement age of 65 is clearly the least preferred option.

Figure 26: Readiness of Individuals
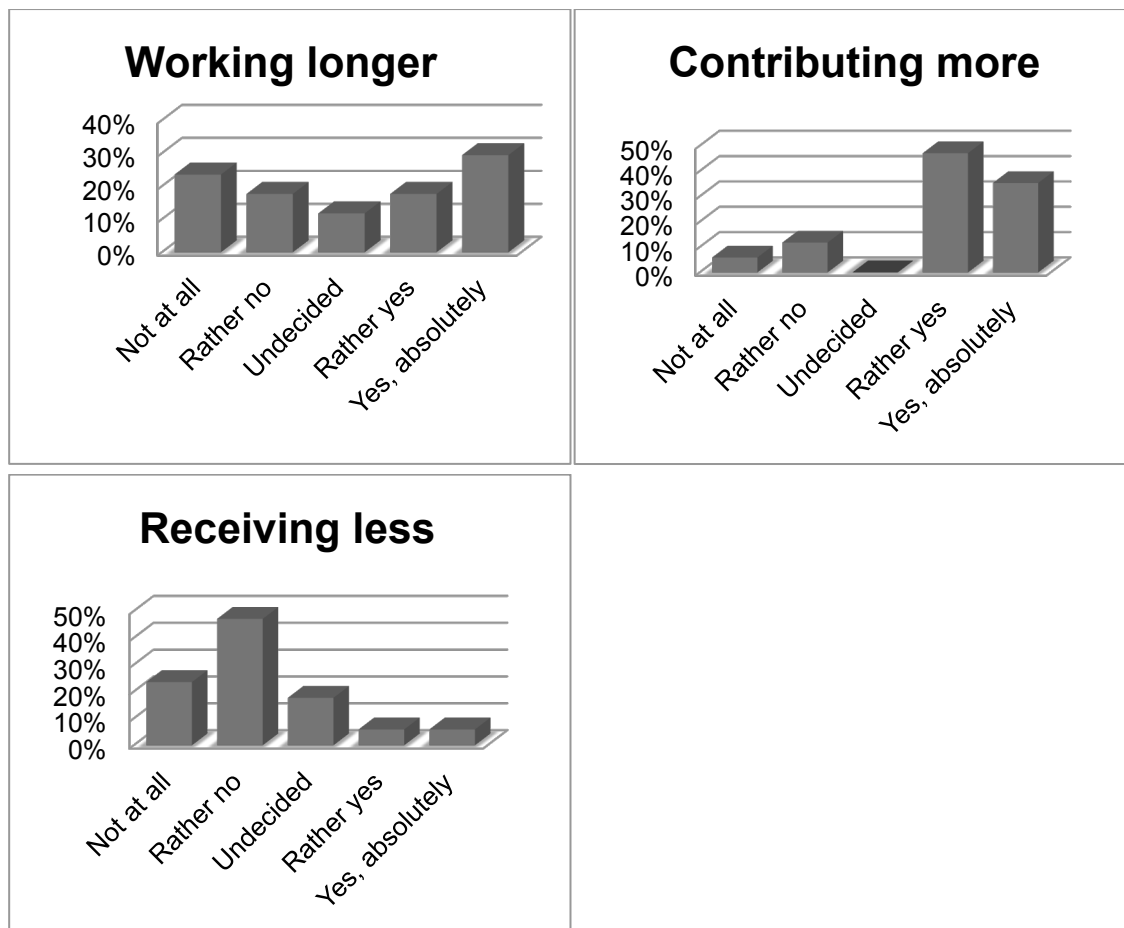
The results from the small sample group reflect a study from AXA (2012): 48 percent of all asked individuals in Switzerland stated they are ready to contribute more for their pension funds if the current benefit level would be retained. 32 percent would be ready to work longer than 65. 20 percent would accept lower pensions if no other measures were taken. The study points out, however, that the willingness for those three measures changes with increasing ages.

5.5 Summary Empirical Analysis of Pension Funds

- Highly regarded three-pillar pension system, but based on outdated parameters (life expectancy, capital market returns)

- Many pension funds (especially public pension funds) are in a worse financial situation than they report (due to excessive technical interest rate)

- 10 percent of contributions of active working generation are transferred and used to finance retiree's pensions ➔ solidarity between young and old in second pillar

- Young generation not aware of solidarity between young and old and young are not aware of its implications

- Knowledge of young generation regarding pension systems and pension funds low (due to high complexity and low interest in the topic in younger years of life)

- Biggest challenges for pension funds: capital market environment, retaining benefit level (i.e. financing a too high benefit level), political risks, demographic ageing

- Politics is challenged to find solutions that do not violate constitutional goal (maintaining living standards) but will sustainably finance the second pillar in the future

- Experts expect increasing life expectancy, volatile capital markets and a low interest environment in the next 5 to 10 years

- New reality for individuals: higher life expectancy, less secured pension benefits in the future ➔ flexible retirement age, work longer, contribute more and take on more self responsibility

6 Recommendations for Regulator, Politics, and Pension Funds

The general structure of the recommendations follows the *OECD roadmap for the good design of defined contribution pension plans,* which has been approved and endorsed by the OECD working party on private pension in June 2012. The outlined solutions are based on 23 high profile expert interviews. A special focus lies on the possibilities of how people aged between 27 and 37 can maximize wealth and utility and actions they can take today (in chapter 7).

Generally speaking, there are major measures that can be taken in order to rebalance the pension fund system. They are: working longer, cutting pension benefits, increasing contributions, or to start contributing earlier in life. In this chapter, measures are presented in a thorough way and with detailed explanations.

OECD Guidelines (OECD, 2012):

1. Ensure the design of DC pension plans is internally coherent between the accumulation and payout phases and with the overall pension system.

2. Encourage people to enroll, to contribute and contribute for long periods.

3. Improve the design of incentives to save for retirement, particularly where participation and contributions to DC pension plans are voluntary.

4. Promote low-cost retirement savings instruments.

5. Establish appropriate default investment strategies, while also providing a choice between investment options with different risk profile and investment horizon.

6. Consider establishing default life-cycle investment strategies as a default option to protect people close to retirement against extreme negative outcomes.

7. For the payout phase, encourage annuitisation as a protection against longevity risk.

8. Promote the supply of annuities and cost-efficient competition in the annuity market.

9. Develop appropriate information and risk-hedging instruments to facilitate dealing with longevity risk.

10. Ensure effective communication and address financial illiteracy and lack of awareness.

6.1 Change of Input Parameters

OECD No. 1: "Ensure the design of DC pension plans is internally coherent between the accumulation and payout phases and with the overall pension system."

First of all, not all experts believe the goal of maintaining the current benefit level should be attainable. But - there is a consensus – in order to sustainably finance pension funds in the next 30 years, measures have to be taken that realistically reflect statistical parameters such as life expectancy.

6.1.1 Longer Working Time

Extending the working period is broadly seen as an effective measure to sustainably finance the occupational pension system. Some experts believe that there even are certain professions where people are willing to work beyond the age of 65. However, all confess that increasing the retirement age among all occupations is unrealistic. Especially those jobs that exhibit physically highly demanding tasks will have difficulties to work longer in their lives. Experts find it legitimate to work beyond 65 in the shade of increasing life expectancies.

Based on calculations of VZ 2005[15], the following graph provides a good approximation until what age people would have to work on average in order to finance a higher conversion rate.

Figure 27: Changes in Conversion Rate with Increasing Retirement Ages Today
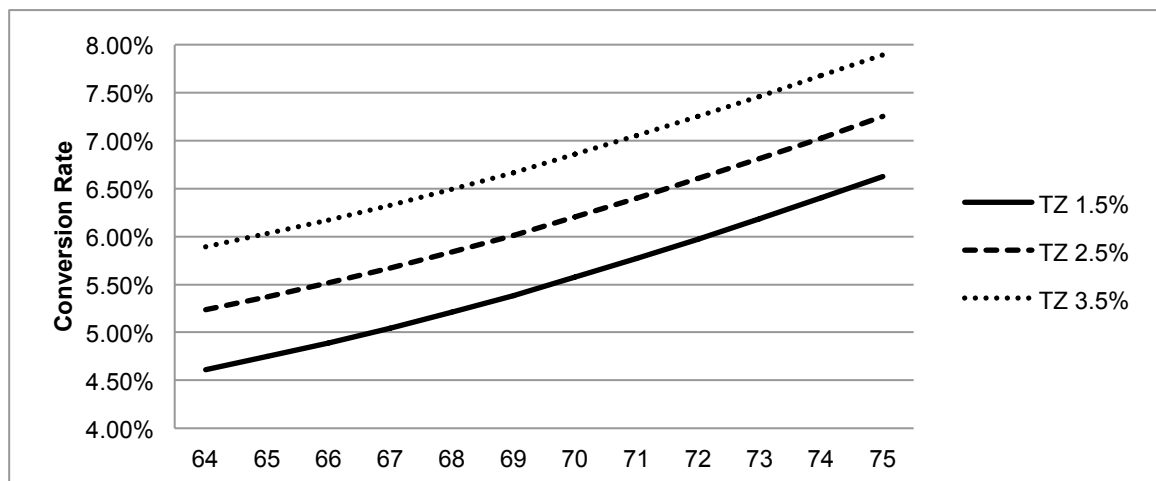
Source: Author based on calculations VZ 2005

It is apparent that even under optimistic assumptions such as a technical interest rate (TZ) of 3.5 percent, the current conversion rate would not be higher than 6 percent. In order to achieve a conversion rate of 6.8 percent as currently used in the BVG minimum, employees would have to work until the age of 68 or 69. With lower technical interest rates, employees would have to work longer than 70. In 30 years, in 2042, if life expectancy increases with the projected trend, one can expect to live additional 5 years at the age of 65 (23.65 years

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[15] Calculations were performed with generation tables, year of birth 1947, and the same weightings as the calculations in chapter 4.8. The conversion rate is gender-weighted with 60% men and 40% women.

for men and 26.45 years for women) (projected with VZ 2005). Experts think that society needs to change the mindset regarding the static retirement age and the population needs to adapt to a new reality.

Experts express their concerns regarding the politically determined parameters such as the conversion rate. They highly promote a politically independent determination of statistical parameters and depoliticize its decisions. Denmark is an example of a country which successfully implemented a model where the official retirement age is linked to the statistically determined life expectancy (Schulz, 2008).

It is recommended to increase the legal retirement age every year by one to two months. Employees should still be given the possibility to retire early, but with lower benefits. Experts are convinced that slow adjustments with a high certainty will be much better accepted in the general public than radical adjustments with low effectiveness.

This recommendation coincides with the recommendation number one of the OECD.

6.1.2 Earlier Contribution

Experts mention the possibility to start contributing earlier at a younger age than 25. They attach, however, a low effectiveness to this measure as the results will only be marginal and only show effect in the years to come, as people aged above 25 today would be excluded.

6.1.3 Increase of Contributions

OECD No. 2: "Encourage people to enrol, to contribute and contribute for long periods."

It was stated from experts and from individuals that an increase in contributions during the working life would be a valuable option. If it is desired to maintain the same benefits, it will cost. As individuals indicated, higher contributions are the most preferred option among working longer or reducing benefits.

A possible way to increase contribution shows the following strategy: the coordination reduction could be lowered to 75 percent of a maximum AHV old age pension, which would result in a decrease from CHF 24,360 to CHF 20,880 and hence results in a higher insured salary. If total salary contributions (paid in equal parts by employee and employer) would be increased by 1.5 percent, the same pension as with a conversion rate of 6.8 percent could be achieved with a conversion rate of 5.8 percent due to a lower coordination reduction and higher contributions (Deprez, 2012). From a macroeconomic perspective increasing contributions not only of employees but also of employers could lead to an inferior competitive economy and labor market compared internationally.

Table 12: Higher Salary Contributions

Age	Current Contributions	New Contributions
25-34	7%	8.5%
35-44	10%	11.5%
45-54	15%	16.5%
55-64	18%	19.5%
Total Contributions	**500%**	**560%**

Source: Author based on Deprez, 2012

Table 13: Effect of Higher Salary Contributions

	Current Model	New Model
Gross salary	CHF 80,000	CHF 80,000
- Coordination reduction	*CHF 24,360*	*CHF 20,880*
Insured salary	CHF 55,640	CHF 59,120
Old age capital at age 65	CHF 278,200	CHF 331,072
Conversion rate	6.8%	5.8%
Pension income p.a.	CHF 18,918	CHF 19,202

Source: Author based on Deprez, 2012

It is thus recommended to consider increasing contributions as a valuable strategy in order to retain the current benefit level (this measure, however, can only show full effect in 40 years after its implementation without any parallel bypassing measures in the meantime).

6.1.4   Reduction of Benefits

New pensions that are paid out today should be 30 percent lower than they really are (Bischofberger and Walser, 2011). In the light of ever-increasing life expectancy and low capital returns, experts doubt that the current benefit level can be maintained. Although all experts agree that the current pensions are too high compared to the technical parameters, the reduction in pension incomes seems to be critical in the light of the constitutional goal of maintaining adequate living standards after retirement. According to the interviews, only few individuals are willing to accept lower pensions. Interestingly, the lower the incomes, the less willing to accept any benefit cuts. Moreover, politicians and the general public voted clearly against a reduction in the conversion rate from 6.8 to 6.4 percent in 2010. As occupational pension funds are part of the social security system, adaptions of the system have to be politically acceptable. To overcome this challenge, experts propose introducing compensation measures for any actions that would affect individuals directly in terms of benefit reductions. Especially the lower middle class that would not profit from supplementary benefits after introducing measures should be compensated.

As mentioned earlier, various pension funds with supra-mandatory capital already decreased their conversion rates by compensating the BVG minimum standards with their voluntary benefits. One of those pension funds is SBB, which lowered their conversion rate

from 6.5 percent to 5.848 percent in 2011 (at the same time they reduced the technical interest rate from 3.5 to 3 percent) (SBB, 2011).

As the interviews with experts and individuals and the vote from 2010 showed, benefit reduction is a sensitive issue, and other measures should be pursued first.

6.2 Removal of Solidarity

According to interviewed professors, a major advantage of the second pillar is the fact that it allows to diversify risks over longer periods and bear together the risks of invalidity and other risks. This solidarity was designed to be in the second pillar and was not criticized by any of the experts. Solidarity between active and passive (meaning between young and old), however, is the solidarity issue in this context that is criticized.

While the majority of experts would not agree to reduce current pensions of retirees (mainly due to the fact that a reduction in current pension would destroy the trust in the whole social security system in Switzerland), almost all experts strongly support reducing or removing transfer payments in the second pillar. In their opinions, individuals should receive what they have accumulated and not more. Experts predict that the younger generation (year of birth 1975 - 1985) is not aware of those transfer payments and criticize the fact that such transfer payments were never designed to be in the second pillar and it is unsure whether future retirees can expect the same solidarity from the next generation. Some highlight the risk associated with such an unwritten generations contract in the second pillar. A few experts reminded of the situation in the 1990s, where solidarity existed vice versa: between the retirees and active employees (mainly due to high interest rates). It should not be forgotten that the situation on the capital market changed dramatically.

A valid question in this context is "if an employer would go bankrupt, who would have to pay for the remaining retirees if there is insufficient funding for their pension payments?"

A possible way to remove solidarity can be the introduction of flexible pensions, which gives pension funds the possibility to include retirees as risk bearers. Although this option is not supported by all experts, it will be presented as a feasible option in chapter 6.6, as it gives pension funds the agility to decrease or increase pensions according to the capital market environment and hence, they are able to reduce solidarity to a greater extend.

6.3 Investment Strategy

Defining sound investment strategies is seen as a crucial task of pension funds. Experts mostly believe that smaller funds should focus on passive investment strategies that are cost efficient, as active asset management is very expensive and only suitable for larger investment funds. Furthermore, investment decisions should be taken by experts only or outsourced to institutional asset experts. Under the current regulations (i.e. investment limits per asset classes), only a few experts believe that higher returns can be achieved with alternative or new asset classes. Those who mention new asset classes as a way for return enhancements most frequently mention infrastructure projects or sustainable long-term investments. Moreover, asset managers admit that alternative investments such as hedge funds or fund of fund investments are very expensive and generally not suitable for pension funds.

Consultants point out that the most important aspect of implementing an investment strategy is one that is based on a thorough asset liability analysis. A crucial aspect in defining a suitable investment strategy is consistency. The recommendation for pension funds is to follow a coherent strategy, which may be defined as follows (Figure 28):

Figure 28: Dynamic Asset Management Strategy
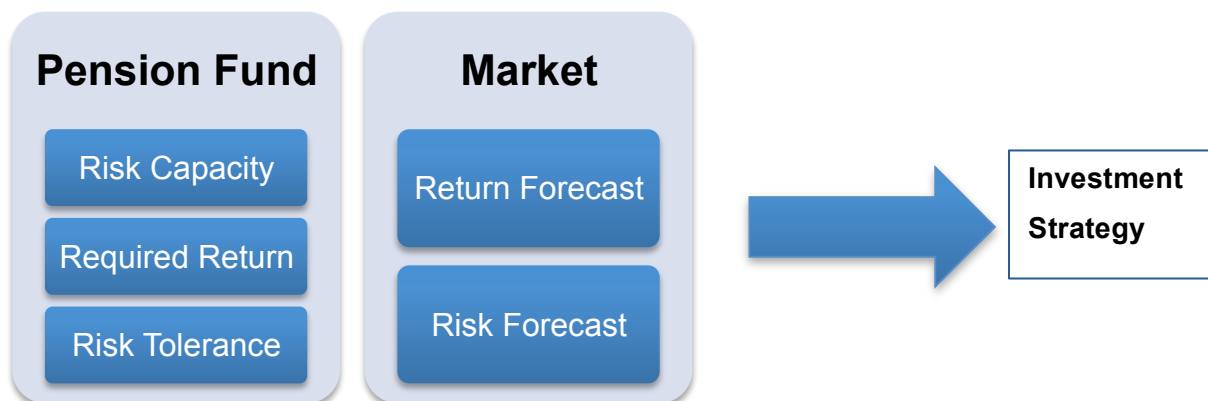
Source: Author adapted from Baumann and Schiess (2012)

Pension funds should hence determine their strategy based on internal factors (pension fund) and external factors (market). If adapting their investment strategies follows a dynamic process, its decision should be based on consistent arguments. The voice of professors and consultants pointed out that a great number of pension funds take inconsistent decisions such as reducing their investments in shares or other volatile asset classes as soon as their funding ratio is below a certain level. On the other hand, if market conditions or market forecasts improve, they adapt their investment strategy to other criteria than internal factors and base their strategy adjustments to external factors and are, hence, not consistent in their asset liability strategy.

It is recommended – to those pension funds that did not adapt already – to carry out investment decisions that are based on an internal asset liability analysis and to adapt their investment decisions according to fully consistent criteria and to not mix those. Furthermore, industry experts should take asset management decisions and its investment processes should be enhanced.

6.4 Optimization of Costs

OECD No. 3: "Promote low-cost retirement savings instruments."

Administrative and asset management costs are seen as an important cost driver for pension funds. Insurers, however, point out that their asset management costs are the best among the whole industry due to their economies of scale advantage. Others state that costs, especially asset management costs, have been steadily decreasing and have been under pressure in the last years due to the tougher capital market environment and the report of C-ALM, which revealed the so-called non transparent or hidden asset management costs such as fees that are incorporated in investment vehicles. Experts highlight that asset management costs should be compared according to the benefits received. Nevertheless, all institutions within the second pillar should reevaluate their custody bank fees and choose among the most efficient (cost benefit approach) supplier. Furthermore, they should carefully analyze fees of alternative investments such as hedge funds or fund of funds. As presented earlier, those investments are, in general, expensive and eventually, their net returns do not exceed conventional investments. The median value of asset management costs is of 0.56 percent of total assets under management within the range of 0.15 to 1.86 percent of total assets under management. Administrative costs are estimated to be of CHF 792 million (Mettler and Schwendener, 2011) per year. The median value of administrative costs per person is, hence, CHF 276 per year (Swisscanto, 2010). Although, on average, these costs seem reasonable, there are huge deviations from this value. Interviewed professors estimate administrative costs of between 0.1 percent up to 1 percent of total assets under management.

Some experts argue that both administrative and asset management costs should be improved first before taking other measures, while other experts argue that reducing administrative and asset management costs would not solve the financial problems of the second pillar for the future.

It can be concluded that pension funds should strive to further reduce costs, become more efficient in administration, and increase their transparency regarding all incurred costs, especially all asset management costs (including fees and retrocessions) and report them as costs. It is furthermore strongly recommended to evaluate the full administration and asset management costs and to renegotiate existing contracts with custody banks. Smaller pension funds are advised not to undertake an active asset management due to relative higher costs. Some experts demand a full transparency of costs.

Hence, optimizing costs is a process that has to be run parallel to other measures in order to increase the financial stability of pension funds. This recommendation coincides with the recommendation number three of the OECD.

6.5 Increase Competition and Harmonization of Regulations

OECD No. 8: "Promote the supply of annuities and cost-efficient competition in the annuity market."

On the one hand, there is naturally no competition between autonomous pension funds, on the other hand, experts see, in general, an intensive competition in the market of life insurers and collective foundations such as pension trusts. The voice of the insurer criticizes the different regulations collective foundations and insurers face. An apparent difference shows the fact that insurers are fully regulated by FINMA, while pension funds and collective foundations are not (FINMA, 2012). They stipulate transparent and coherent regulations within the free pension funds market. Some experts raise the concern that the market for full life insurance is in a vacuum and that only a few market participants are willing to offer full guarantees. Experts see a minimum entry level for an autonomous pension fund of more than 500 employees and assets under management of above CHF 100 million in order to run efficiently.

The consolidation of pension funds is expected to continue. The reasons, however, are also seen in the increased complexity and new accounting standards. Although more competition in the pension fund market would enhance cost-efficiency, some experts see, in a world of fully liberalized pension institutions, the major drawback in the lack of willingness of employers to support independent pension funds. Another disadvantage might be that the majority of employees would seek to insure themselves at the pension funds with the best funding ratios and those with funding ratios below 100 percent would be pushed out of the market. From a sole market perspective, increased competition might be a sensible idea, but bears some downside risks.

What is proposed, however, is to reduce complexity and to harmonize regulations among all pension institutions. Moreover, where possible conflict of interests may exist (e.g. where board of trustees would be immediately affected personally by decisions taken by the board), new regulations should eliminate any possible occurrence of conflict of interest as it may hinder economically efficient decisions. A further recommendation is a complete separation of power within pension funds.

6.6 Flexible Pensions

The pension fund of PriceWaterhouse-Coopers Switzerland (PWC) introduced in 2005 an extraordinary pension model that guarantees a fixed pension and a variable part of pension income that is based on the development of the capital market (the average performance of a three-year period determines the level of the variable part). PWC accomplished with this model a partial risk sharing between active employees and retirees and, on the other side, active employees and retirees would benefit equally from a good development at the capital market.

The model is illustrated simplified below with an example of a retiree with an accumulated old age capital of CHF 500,000. The yearly goal pension is CHF 30,000 with a fictitious conversion rate of 6%. In this example, the pension that is guaranteed accounts for 80 per-

cent and the bonus or variable part accounts for 20 percent of the total pension. The variable part depends on the capital market returns and can be as low as 0 percent (0 CHF) or 40 percent (CHF 12,000). This model presents various advantages: not only are retirees risk bearers, but their pension fund has an instrument in order to react to different capital market conditions. As retirees participate at the capital market, they are also, to a certain extend, hedged against inflation. If inflation were to be present in the years to come (which normally increases interest rates, too), they would participate from higher pensions due to their variable pension that is linked to the capital market performance.

PWC proofed this model in real life as a valuable tool in a way that did not increase management complexity.

It has to be mentioned, however, that PWC was only able to introduce such a model due to the fact that the majority of their employees earn more than the BVG minimum of CHF 83,520 and are thus able to still guarantee the BVG minimum benefit even in situations where the variable part would be zero. Thus, this model under the current benefit requirements on BVG is only applicable to those pension funds that insure employees earning above BVG minimum.

Figure 29: Flexible Pension Model
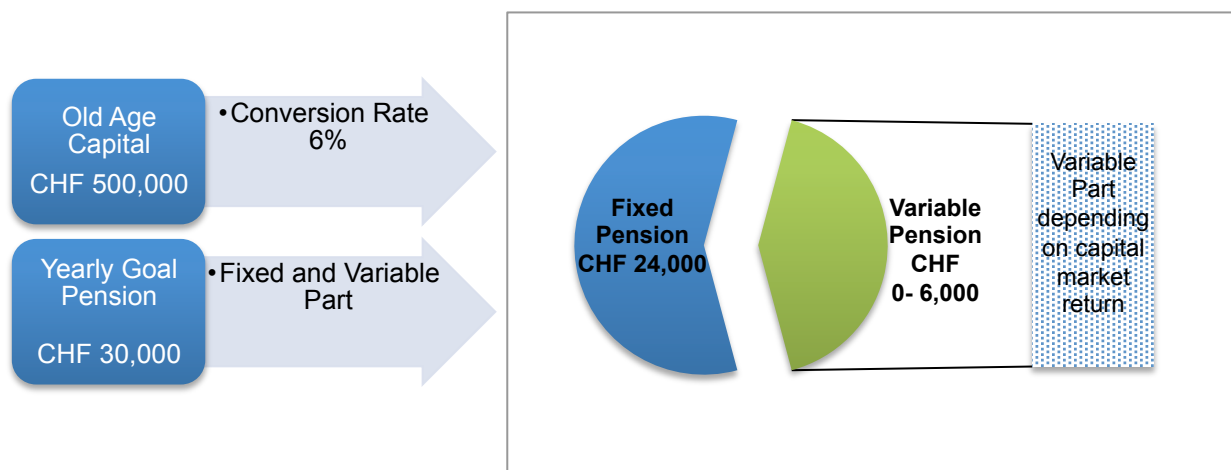
Source: Author based on information PWC, 2012

Politicians and regulators are advised to consider this model to adapt to the BVG minimum pension funds. With such a system, future retirees are not being promised more money than they are entitled to receive. It would make the pensions more realistic and more dynamic and would reduce guarantees and make them more secure.

6.7 Flexible Retirement Age and Work Models

Professors express the need to flexibilize the legal retirement age. Although people can already retire a few years early and in some industries, employees are allowed to work beyond the age of 65, it is not yet a common work model in Switzerland. Experts propose that the government should introduce incentives for employees and employers to work longer. Especially the social security expenses for companies should be substantially lowered after the legal retirement age in order to give employers higher incentives to employ older workers. Experts are convinced that the economy will have to learn to profit from the richness of experience of older employees. There are indeed already initiatives that try to keep older workers in the workforce, as stated by one of the experts. If economic growth continues and, based on the projections of the FSO, the working population will remain stable and, hence, the risk of higher unemployment of young people can be neglected in this respect according to interviewed experts.

It is recommended to abolish a fixed legal retirement age and instead introduce a flexible retirement age with enhanced incentives for both employers and employees to work longer. Furthermore, politicians and the economy as a whole have to learn that traditional career paths are outdated. The analysis of social factors described in chapter 4.4 shows a clear tendency to part-time employment in given stages of life. A study from BSV illustrates the trend towards continuous employment after the age of 65 (17 percent of men and 8 percent of women were still employed beyond the legal retirement age (Wanner and Gabadinho, 2008).

6.8 Improval of Communication

OECD No. 10: "Ensure effective communication and address financial illiteracy and lack of awareness."

The interviews with individuals, but also the impression of experts, show the knowledge of individuals is low and many employees are not able to understand their statements regarding their pension entitlements. As many individuals expressed high complexity as a main reason they deal insufficiently with the documents of their pension funds, many experts regard improving communication as an important measure. While there already are some pension funds and insurances that improved their communication and enhanced effective communications with individuals, some still see optimization potential. Most of the experts believe, in one way or the other, that individuals should be aware of their insured benefits of their pension fund at the time of beginning of work. Ideas are information campaigns for people aged between 25 and 40, where employers offer interactive material regarding the functionality of pension fund institutions. Young employees (that are contributing to transfer payments to retirees) should be sensitized to the functionality of the pension fund institutions and the main regulations and they should be aware of the current issues in this field.

Some experts strongly demand to emphasize expectation management.

Furthermore, the whole industry is advised to rebuild trust. The voices of the insurer mention their duty to rebuild trust that has been lost in the last years. Many insurers were criti-

cized due to high fees, high salaries and other things. A professor noticed that media coverage of the insurers is much higher than those of pension funds and trusts regarding the financial problematic of pension funds.

According to recommendation 10 of the OECD roadmap, pension funds are advised to provide regular individualized benefit statements with clear benefit projections under realistic assumptions. Many experts propose to reduce complexity and communicate with individuals in simple language and provide material that is readily understood by them. Moreover, the OECD further proposes to inform individuals about the possible impact of higher contributions or later retirement on their benefits, which is a sensible recommendation for all pension funds that do not provide such information already.

Transparent communication is not only desired by experts, but also by individuals. Many stated they wish to be informed in a transparent and honest manner without the whitewashing of facts.

Almost all experts regard financial literacy an important skill. Many demand an integration of financial literacy and finance mathematical calculations in high School. They are convinced this knowledge would help to improve persons' comprehension of pension funds and knowledge of managing money in general. Chapter 7.2 elaborates further on this point.

7 Recommendations for Individuals

Politicians and pension funds have complex challenges to master. Due to demographic changes, capital market, and societal changes, the generation born between 1975 and 1985 has to expect to be substantially affected by any taken measures in the future. The preceding chapters pointed out that life expectancy further increases and a man can expect to live on average at least until 88 and a woman until 91 by 2040 (forecasts based on VZ 2005). Keeping the current retirement age and pension contributions would result in a occupational pension income reduction between 14 and 36 percent (cp. chapter 4.8).

This chapter is thus intended to give the younger population strategies at hand and actions they can take today in order to prepare successfully for an altered environment. After all, this thesis intends to show ways of how to secure a wealthy retirement for Swiss individuals in between 2040 and 2050.

7.1 Preparation for a New Reality

Although only a few experts believe the current benefit level should be attained, all agree that it will be a costly affair to sustainably finance the second pillar institution in the years to come. Many experts among all sectors believe the current social security welfare benefits can hardly be maintained in the future, except a major innovation will lead to unexpected economic or productivity growth.

Experts are convinced the middle class will have to bear the highest burden in adapting the social security system. They encourage the young generations to deal more with financial questions and to increase their awareness of current challenges and its implications. The recommendations based on expert interviews are as follows: firstly, invest in your education, not only occupational education, but also financial education. Secondly, start saving as early as you enter your working life and discipline consumption expenses. Thirdly, take on more self-responsibility regarding your financial future and be prepared for changes in the Swiss social security system. Whether or not saved money is used for the time after retirement is not a central question in younger ages, but having money saved gives more options and flexibility to adapt to a new environment.

7.2 Pension Literacy

OECD No. 10: "Ensure effective communication and address financial illiteracy and lack of awareness."

Experts are convinced that teaching financial knowledge is not sufficiently regarded as important in the Swiss society. The results of the survey among individuals and the AXA report show, in general, a low basic financial knowledge regarding pension funds. Most of the experts regard financial education as important for individuals to better comprehend their own financial situation, but also to understand which benefits they are entitled to and how to increase their pension income. Furthermore, as one of the most important factors in calculation pensions is politically determined, individuals should understand what the implications of a too high conversion rate are.

Experts propose to weight financial education in Schools more, especially in vocational Schools or Universities where working life is close.

Today, individuals are advised to study all relevant material of their pension fund and consult their pension fund directly in case of uncertainty. There are many books available that explain countless aspects in readily understandable language. In chapter 11.6, a list of recommended links is presented.

7.3 Financial Planning

OECD No. 7: "For the payout phase, encourage annuitisation as a protection against longevity risk."

Most experts advise young people to make a financial plan as soon as they start working and fully contribute to their retirement funds. While most agree that creating an exact financial plan is unrealistic at the age of 25 to 35, there is a general consensus to setup a financial plan early in life and to revise it every 5 to 10 years until the age of 50. After the age of 50 or 55, experts strongly recommend to plan for retirement as there is still enough time to accomplish saving aims and to make use of tax advantages and retirement is near enough to imagine most aspects of retirement.

A further recommendation is to adapt the financial plan after major life events such as marriage, children, buying a house or changing the workplace. Therefore, financial planning skills should be an ongoing process. Occasionally, consulting with financial planners may help many individuals to profit from experience and knowledge from experts (in order to get neutral and specific advice, individuals should make sure the financial advisor is an independent advisor and free of self-interests).

Experts warn individuals that managing money, investing and monitor investments are challenging tasks. The OECD recommends discouraging individuals from lump-sum payments instead of receiving a life-long annuity in order to protect individuals against longevity risk. Interviewed experts stated that managing and investing money after retirement is not only time consuming, but also costly. They are convinced that individuals cannot achieve lower expenses and higher returns managing their money on their own than pension funds as individuals do not have any economies of scale possibilities. However, almost all experts encourage individuals to save and to invest money for the long term outside the first and second pillar. The next chapter provides strategies and investment recommendations.

7.4 Investing

Experts encourage individuals to save a part of their salary and to start such saving processes early, as compounding interest effects are considerable over longer periods. Before investment recommendations are presented, a tool illustrated by one of the interviewed experts of how to manage money (taking into account a planning horizon of 30 years or more) is presented.

Figure 30: Investment Strategy

Short Term *1 Year*	→	Mid Term *2-5 Years*	→	Long Term *5-40 Years*
• **Risk:** Zero risk, no volatility • **Investments:** Saving account • **How much:** Sufficient money to cover money needs in the current year		• **Risk:** Low to moderate risk, low volatility • **Investments:** Saving account Bonds Stocks => ETF		• **Risk:** High risk, high volatility • **Investments:** Stocks Real Estate Short term bonds Precious Metals Raw Material Private Equity => ETF

Source: Author

The advice is as follows: Create three pots while you put as much money as you need within a year in pot 1, with which you do not take any risks and no volatility. Most common investment vehicles are cash and saving accounts (make sure you optimize your banking fees). What to do in the next two pots depends on your risk capacity and risk appetite.

In pot 2, you invest a part of your salary that you can afford to invest for the next 2 to 5 years with moderate risk as the planning horizon is only mid-term.

The third pot is to invest money that you are not dependent on in the next 5 to 40 years. Due to a long investment horizon – if your risk appetite allows it – you should invest for the long run in real assets. Experts strongly advise to invest in investment vehicles that are cost efficient such as ETF and offer a good diversification. Now we look in more detail to investment possibilities. Experts discourage from nominal long-term investments, as they see an increased probability for future inflation. Investment recommendations mentioned most frequently were investments in real assets such as shares (a share quote of more than 50 percent), especially outside Europe, to some extend in emerging markets). Moreover, many experts recommend investing in real estate, although prices for real estate have increased substantially in the last years, and in precious metals and raw materials. After all, principles such as inflation-protected investments coupled with good diversification are strongly advised. Investment proposal can be generated under the links in chapter 12.6 (individuals should also compare trading and bank fees and trade with the most cost efficient suppliers).

Experts assess the potential of individuals to save more money for their retirement as very diverse and different from person to person. The results of the interviews with individuals, however, show that individuals could save on average an extra CHF 300 (median value) per month.

In order to benefit from tax advantages, individuals should make use of investing or saving in a third pillar account (3a). Whether they decide to put their money in a savings account or in a fund, they should compare the offered interest rates for saving accounts and fees of funds (money within the third pillar can also be transferred). In the appendix, chapter 12.6, there is a list of links where interest rates and fees of funds can be compared.

In the following example, a yearly contribution of CHF 6,000 is assumed starting at age 30 until age 65. In this illustration, a 1 percent interest rate difference results in a final capital deviation of over CHF 60,000 at the age of 65 (Figure 31). This example shows that the selection of the best interest rate offer on a pillar 3a[16] account is crucial in order to receive the maximal amount at time of retirement. Payments to pillar 3a are deducible from income tax and its capital returns are tax-free, which enhance returns even more.

In order to assess the long-term returns of payments in a pillar 3a account, the following factors have to be evaluated: investment horizon, marginal rate of tax reduction due to tied pension payments to pillar 3a, capital tax at time of obtaining lump-sum, return of pillar 3a account (Schubiger, 2009). In general, a high marginal rate of tax reduction, low capital taxes, short investment horizons, and low investment returns enhance the tax effect of the pillar 3a saving strategy (Schubiger, 2009). Individual analyses regarding optimization of pillar 3a contributions can be done on websites presented in chapter 12.6.

Figure 31: Capital Accumulation in Pillar 3a
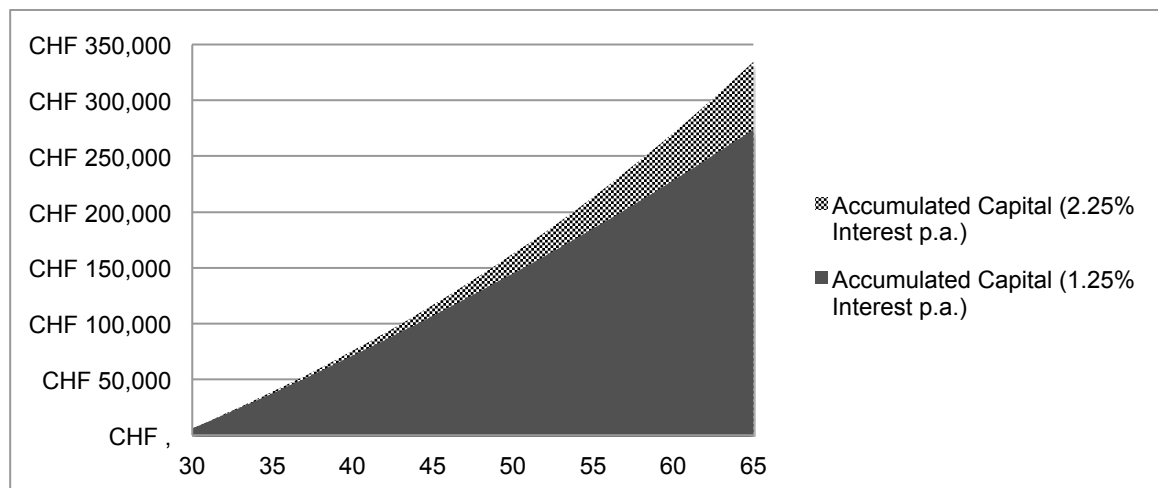
Source: Author

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[16] Currently the highest offered interest rate for a pillar 3a account is 2.25% p.a. by Banca Popolare di Sondrio (VZ VermögensZentrum, 2012)

8   Actions

	Politicians and Regulator	Pension Funds	Individuals
New Reality	Base pension models on realistic parameters. Introduce counter measures for possible benefit reductions, but stop exhibiting too high benefits from pension funds.	Lobby for reducing conversion rate and removal of solidarity	Prepare for a new reality:
	Depoliticize technical parameters (remove solidarity in second pillar)	Conduct expectation management	Work longer (1-2 months per year)
	Communicate with full truth without whitewashing of facts	Improve communication (explain in simple language the challenges pension funds and society have to tackle)	Increase salary contributins (0.75 % higher monthly salary contributions)
	Make funding rations comparable (with homogenous TZ)	Build trust	Adapt to flexible work models
	Define a precise constitutional goal regarding maintaining adequate living standards	Inform young employees better (evaluate interactive options such as websites, videos)	Take on more self responsibility
	Make it more attractive to companies to employ older workers (increase participation rate of older workers)	Explain solidarity to young generations, create awareness of challenges and possible solutions	Be prepared for flexible pensions and less guarantees
Financial Literacy	Implement financial education in School	Education: sensitize young people for challenges	Gain financial literacy, invest in your financial education
	Inform general public about current challenges in the second pillar	Inform and provide information material	Inform yourself about your pension fund and its offered benefits
	Education: sensitize young people for challenges and demographic changes		Exhibit further information from your pension fund in case of unclarity
Financial Planning	Make financial planning and subject of money part of the curriculum in School	Sensitive young generation for importance to expose oneself to questions regarding financial planning	Start to plan your financial future at age 25 and review plan every 5-10 years or after every life event

		Motivate young people to plan financial situation (and offer advise to young people)	Start to save early (pillar 3a) and choose best option (cp. chapter 7.4)
		Discourage people with insufficient money skills to take lump-sum instead of life long annuity	Invest money according to your investment strategy and manage your money needs
Critical Success Factors	Increase competition in the free pension fund market	Optimize administrative and asset management costs	Evaluate the best options to save for retirement (e.g. pillar 3a)
	Simplify and reduce regulations in the second pillar	Improve asset management decision making processes (professionalize)	
	Harmonize regulations for all pension fund institutions in the second pillar	Implement a coherent investment scheme based on a coherent asset-liability strategy	
	Reduce complexity of second pillar	Reduce complexity and increase transparency	
	Exhibit full transparency of pension funds (including asset management costs and retrocessions)	Remove potential conflict of interest situation in board of pension funds	

9   Conclusion and Outlook

Switzerland has a highly regarded three-pillar pension system, but it has become clear that the current benefit level of pension funds is far too high based on current input parameters such as increased life expectancy and capital market returns. Thus, although the system is only 27 years in place and still a young system, some major adaptions in the near future are inevitable in order to sustainably finance pension funds the future decades. Although a reduction of the current benefit level by 20 to 30 percent in the next 30 years looks fairly dramatic, under the aspect of an increased life expectancy of nearly 5 years, it seems justifiable and not so bad taking into account a life extension of 5 years after retirement.

The research in this master's thesis has shown that the general public today is not willing to accept pension income reductions. The majority is ready to contribute more during his or her working life in order to receive the same pension level in the future at the age of retirement. Working longer represents an option too, and the young generation has to be prepared to adapt to such changes (however in physically highly demanding jobs people may not be able to work beyond 65).

All interviewed experts state the biggest challenges for pension funds are the current capital market environment, retaining benefit level (i.e. financing a too high benefit level), political risks, and demographic ageing. They urge politicians to depoliticize technical parameters and remove solidarity between young and old in the second pillar. People aged 27 to 37 have to prepare for a new reality, which may mean less guaranteed pension benefits, contribute more or longer, and they should improve their financial literacy and financial planning skills in order to be better prepared for the future.

In order to find a consensus in the Swiss society and comply with the constitutional goal of maintaining living standards after retirement, counter measures for a possible benefit reduction might be a serious option. Time is important and it is utterly crucial that measures are taken already today in order to sustainably finance the second pillar the coming 30 - 40 years. Although such measures are politically very demanding and may threaten popularity of politicians, it is absolutely necessary to face the reality without whitewashing of the facts. Simple solutions that are realizable are probably better than exhibiting too much at once.

In order to compare the financial situation of pension funds, it is recommended to use a homogenous and realistic technical interest rate (TZ) among all pension funds. Many pension funds still use a too high technical interest rate, which underestimates the current pension liabilities. A reduction in the technical interest, rate, however, will cost billions of Swiss Francs as pension liabilities due to a lower discounting effect and hence a higher present value. This seems to be the main reason why various pension funds did not reduce it already to a lower level.

Recommendations vary from harmonization and simplification of regulations for politicians and regulators, to optimize administrative and asset management costs and improve communication with younger generation for pension funds. Finally, the young generation has to take on more self-responsibility and is encouraged to save in a pillar 3a account and to invest in real assets for the long run.

Although some recommendations might seem easy to implement, the pension system is part of the well-balanced social security system in Switzerland and hence politically conditioned. The author's hope is that politicians understand the current challenges and see the necessity to take unpopular decisions. Measures should be implemented as soon as possible as the price to pay gets higher the longer we wait. An attainable goal should be to rebalance unnecessary solidarity between young to old in the second pillar, particularly in the shade of population dynamics and an ever increasing life expectancy and an increased old-age dependency ratio.

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12 Appendices

12.1 List of Expert-Interviewees

Title	First Name	Last Name	Sector	Position
Mr.	Hanspeter	Konrad	Pension Fund	Director of *ASIP*
Mr.	Michael	Schmidt	Pension Fund	Managing Director of *Pensionskasse ALVOSO LLB*
Dr.	Jörg	Müller Ganz	Pension Fund	President of Pension Fund *Zürcher Kantonalbank*
Mr.	Josef	Bachmann	Pension Fund	Managing Director of Pension Fund *PWC*
Mr.	Othmar	Simeon	Pension Fund	Director market area occupational benefits *Swisscanto*
Dr.	Urs	Berger	Insurance	Chairman *SIA* and chairman of the board of directors *Die Mobiliar*
Mr.	Andreas	Zingg	Insurance	Manager of market area corporate customers *Swiss Life*
Mr.	Beat	Kaufmann	Insurance	Director of proposition management, life insurance *Zurich Insurance*
Mr.	Donald	Desax	Insurance	Manager of market area occupational benefit insurance *Helvetia*
Mr.	Felix	Schmidt	Insurance	Manager life insurance corporate customers *Basler Versicherung*
Dr.	Dominique	Ammann	Consultant	Managing Partner *PPC Metrics*
Dr.	Roger	Baumann	Consultant	Managing Partner *C-ALM*
Mr.	Christoph	Furrer	Consultant	Managing Partner *DEPREZ*
Mr.	Martin	Hubatka	Consultant	Managing Partner *Allvisa Vorsorge*
Prof. Dr.	Josef	Marbacher	Academic	Professor at *University of Applied Sciences Northwestern Switzerland*
Prof. Dr.	Martin	Janssen	Academic	Professor at *University Zurich* and Managing Partner of *ECOFIN*
Prof. Dr.	Ueli	Kieser	Academic	Professor at *University of St. Gallen*
Prof. Dr.	Martin	Eling	Academic	Professor at *University of St. Gallen*
Ms.	Antoinette	Hunziker-Ebneter	Asset Manager	CEO and Founding Partner *forma futura*
Mr.	Rauol	Hinder	Asset Manager	Managing Partner *Portfolio Consulting AG*
Mr.	Martin	Kaiser	Other	Deputy Director *Federal Social Insurance Office*
Dr.	Vera	Kupper	Other	Vice President *Oversight Committee of the Occupation Pension Funds (OAK BV)*
Dr.	Jerome	Cosandey	Other	Project Manager *Avenir Suisse*

12.2 Interview Guideline Experts

	Current situation of pension funds
1	How do you assess the financial situation of pension funds in Switzerland in general?
	In which areas do you see the main risks and challenges for the second pillar?
	What are the strengths and weaknesses of the Swiss three-pillar system?
	What is currently the actuarial correct conversion rate and TZ at retirement age 65 for men and 64 for women?
	How do you assess the competition within the second pillar? Are there too many or too little pension funds?
	How do you assess costs of pension funds, especially asset management costs of pension funds?

	Expected changes
2	What financial returns (risk free) do you expect for the next 5 to 10 years?
	What life expectancies do you expect in the next 30 years?
	How will pension payment change in the next 30 years (second pillar)?
	What are the main challenges for the pension fund system in the next 30 years?
	How do you assess the political changes and their influence on pension funds?
	What are the consequences for pension funds if nothing changes?

	Preparation of pension funds regarding expected changes
3	What are the consequences for pension funds due to the high guaranteed minimal benefits?
	How do you assess the solidarity between active employees and retirees?
	What do you try to compensate the BVG minimum benefits?
	Where do you see need for action short- and long-term for pension funds?

	Evaluation of individuals
4	How important is knowledge about financial planning and financial investments in order to plan for a wealthy retirement?
	At what age do you think it is sensible to plan the financial situation for retirement?
	How should individuals expose themselves to financial questions in order to compensate future benefit cuts?

University of St.Gallen

	What are the new challenges and for 1st and 2nd pillar?
	How high do you assess the readiness of individuals in terms of: Work longer than 65 Contribute more Accept lower benefits

	Solution proposals
5	What has to be changed to guarantee the same pensions in 30 years as today? Is this aim attainable or worth striving for?
	What actions do you recommend in order to sustainably finance the second pillar the next 30 to 40 years?
	If less pensions can be paid in the future, what would you suggest the younger generation born 1975-1985 in order not to live with less pension income?
	What have future retirees (retirement in 2030-2040) to expect?
	My calculations (based on a technical interest rate of 1.5-3.5%) predict that the generation born between 1975 – 1985 have to live with 10 – 30% less pension income from the second pillar. Especially the middle class would be hit hardly. Which strategies would be propose in order to close this gap? (who and why?)
	What would you recommend to change at the system in order that the future pension generation can enjoy the same living standard as today's retirees?
	How do you assess the potential and willingness of the younger generations (1975-1985) to save more or to create additional wealth?
	Which investments do you recommend to the generation born between 1975 and 1985 (under the assumption that they have a time horizon of 30 to 35 years which allows them to be more risk tolerant?
	In how far are heritages a possible strategy to take into a wealthy retirement planning?

	Additional questions for institutional asset managers
6	Which financial assets do you recommend to pension funds and which returns can they achieve with them?
	Where is optimization potential in the investment process of pension funds and how high is their effect on costs and returns?
	How do restrictions affect return prospects? What should be changed?
	How do you assess the VV costs (report from C-ALM)? Where and how is their potential to do it better?

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12.3 List of Individual Interviewees

Year of birth	Yearly gross income	Marital status	Sector
1981	CHF 80,000-120,000	Single	Service Industry
1981	CHF 40,000-80,000	Single	Industrial Production
1978	CHF 80,000-120,000	Married	Industrial Production
1977	CHF 40,000-80,000	Married	Service Industry
1982	CHF 40,000-80,000	Single	Service Industry
1982	CHF 80,000-120,000	Married	Service Industry
1981	CHF 80,000-120,000	Single	Service Industry
1984	CHF <40,000	Single	Government
1983	CHF 80,000-120,000	Single	Service Industry
1979	CHF >120,000	Single	Service Industry
1976	CHF 80,000-120,000	Married	Service Industry
1977	CHF 80,000-120,000	Married	Journalism
1982	CHF 40,000-80,000	Married	Nursing
1981	CHF 40,000-80,000	Married	Nursing
1985	CHF 80,000-120,000	Single	Industrial Production
1983	CHF 40,000-80,000	Single	Construction
1983	CHF 40,000-80,000	Married	Teacher

12.4 Interview Guideline Individuals

Basic Information	
1	Year of birth
	Gender
	Marital status
	Income range (gross annual income) < 40,000 CHF 40,000 - 80,000 CHF 80,000-120,000 CHF > 120,000 CHF
	Number of children
	Number of years affiliated with a pension fund

	Knowledge regarding pension funds and financial planning
2	How good do you think is your knowledge regarding pension funds? (Scale 1-6) Why do you think your knowledge is high/low?
	Of what do you think of if you hear demographic changes in Switzerland?
	Which factors do influence according to you a pension?
	Do you have a perception with how much pension are you going to retire? (1st and 2nd pillar)
	Have you heard the following expressions and if yes what do you understand by it? Minimum conversion rate Minimum interest rate Technical interst rate
	Are you paying in a 3rd pillar (3a) account at minimum every second year? If yes, do you pay the tax incentivized maximum amount?

	Trust in first and second pillar
3	How high is your trust in the concept of the AHV (as a existence securing pension)? (scale 1-6) (why?)
	How high is your trust in the concept of your pension fund (1st and 2nd pillar should enable you to continue your habitual living standard)? (scale 1-6)
	Do you expect more, less, or an equal pension at the time of your retirement than the generation of today? If yes, how much less do you expect? (in percentage)
	How much money do you think you will need once you are retired (imagine you are single)?
	Are you doing something in order to guarantee yourself a sufficient pension at the time of retirement? Do you have a strategy in place?
	If you would have the possibility of getting your old age capital at the time of retirement as a lump sum, would you do it? If yes, what would you do with it? If no, why not?
	Where do you see the major challenges of the 1st and 2nd pillar?

	Expectations
4	Calculations that I did but also academic studies (such as a report from Credit Suisse) show that the current used conversion rate is 10-15% too high. This results in a deficit of approximately CHF 1 bn.. Who should bear this deficit in your opinion?
	What do you expect from your pension fund?
	What has to be improved at the current three-pillar system?

	In order to keep the second pillar sufficiently and balanced financed, who should steer that?
	Readiness of individuals
	How high is your readiness in terms of (scale 1-5): Work longer than 65 Contribute more Accept lower benefits
	Are you ready to work longer in order to receive the same pension? If yes, how many years?
	Are you ready to contribute more in order to receive the same pension? If yes, how much per month (in percentage of your gross salary?)
5	Are you ready to accept a lower pension but keeping the same retirement age and un-changed contributions? How do you favor the options mentioned above? (most/least favorable)
	How much money could you imagine to save in addition for the time after retirement?
	At what age do you think it is sensible to plan the financial aspects of your retirement?
	What would you do today if you would know that you receive 20 percent less pension income at time of retirement?
	Are you planning heritages and are you taking those into account in order to plan for your financial situation at retirement?

12.5 Further Calculations Conversion Rate and Future Retirement Income

Table 14: Income Gap Calculation 1980 Men

Gender	M					
Year of Birth	1980					
Year of Retirement	2045					
Technical Interest Rate	**1.5%**		**2.5%**		**3.5%**	
Minimum Interest Rate	**1.5%**		**2.5%**		**3.5%**	
Income at age 25 (Start Income)	52,300	65,400	52,300	65,400	52,300	65,400
Income at age 65 (End income)	65,131	104,147	65,131	104,147	65,131	104,147
Average real salary increase p.a.*	0.55%	1.17%	0.55%	1.17%	0.55%	1.17%
Accumulated capital in 2nd pillar	232,105	406,254	275,384	477,758	330,261	567,790
Remaining Life Expectancy in 2045	23.83					
Conversion Rate 2012	6.90%					
Conversion Rate 2045**	**4.43%**		**5.05%**		**5.70%**	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	1,335	2,336	1,583	2,747	1,899	3,265
Pension Income 2045 with new Conversion Rate (2nd pillar)**	857	1,499	1,158	2,010	1,569	2,697
Difference in Retirement Income (2045– 2012)**	**(478)** **-35.8%**	**(836)** **-35.8%**	**(425)** **-26.8%**	**(737)** **-26.8%**	**(330)** **-17.4%**	**(568)** **-17.4%**

* based on FSO, 2008b (see table 10)

** based on author's model

Table 15: Income Gap Calculation 1980 Women

Gender	F					
Year of Birth	1980					
Year of Retirement	2045					
Technical Interest Rate	**1.5%**		**2.5%**		**3.5%**	
Minimum Interest Rate	**1.5%**		**2.5%**		**3.5%**	
Income at age 25 (Start Income)	47,300	63,700	47,300	63,700	47,300	63,700
Income at age 65 (End income)	53,321	90,795	53,321	90,795	53,321	90,795
Average real salary increase p.a.*	0.30%	0.89%	0.30%	0.89%	0.30%	0.89%
Accumulated capital in 2nd pillar	174,890	356,814	208,453	421,423	251,159	503,056
Remaining Life Expectancy in 2045	26.62					
Conversion Rate 2012	6.85%					
Conversion Rate 2045**	**4.58%**		**5.20%**		**5.85%**	
Pension Income 2012 with Conversion Rate 6.9% (2nd pillar)	998	2,037	1,190	2,406	1,434	2,872

Pension Income 2045 with new Conversion Rate (2nd pillar)**	668	1,363	904	1,827	1,225	2,454
Difference in Retirement Income (2045 – 2012)**	**(330)** **-33.1%**	**(674)** **-33.1%**	**(286)** **-24.0%**	**(578)** **-24.0%**	**(208)** **-14.5%**	**(417)** **-14.5%**

* based on FSO, 2008b (see table 10)

** based on author's model

12.6 Useful Links

General Information about pension funds:

www.mit-uns-fuer-uns.ch

http://www.bvgauskuenfte.ch

Comparing pillar 3a offers:

http://www.vermoegenszentrum.ch/Privatkunden/Vergleiche---Rechner/Saule-3a/Zinskonto

Calculation of after tax returns with pillar 3a contributions:

http://www.123-pensionierung.ch/de/saeule-3a/einzahlen-3a/einzahlen-saeule-3a

Investment Strategies:

www.i-portfolio.ch

12.7 Declaration of Authorship

I hereby declare

- that I have written this thesis without any help from others and without the use of documents and aids other than those stated above,

- that I have mentioned all used sources and that I have cited them correctly according to established academic citation rules.

Date   5 October 2012

Signature   ……………….............