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## Risk-Management

Some of the graphs/pictures are not available online

### **Pension Fund Risk Management**

The Swiss Pensions System: Risk Management?  
... Lessons Learned

PPCmetrics SA (CH - Zurich & Nyon)  
Alfredo Fusetti, Senior Consultant

Rome, 19 June 2012

## Agenda

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# The Three-Pillars System

# Three-Pillars System (1)

## Introduction (I)

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- ▶ The Swiss Retirement System is based on three pillars.

# Three-Pillars System (2)

## Introduction (II)

- **1<sup>st</sup> = Public Pillar (AHV/IV)**
  - Regulated on federal level by the «Legge federale sulla previdenza professionale per la vecchiaia, i superstiti e l'invalidità» (AHVG)
  - Mandatory
  - Collective financing, redistributive, no saving component
  - Managed by a federal, public fund (AVS-Fund)
  - ▶ **Pay-as-you-go principle**
- **2<sup>nd</sup> = Occupational Pillar (BVG)**
  - Regulated on federal level by the «Legge federale sulla previdenza professionale per la vecchiaia, i superstiti e l'invalidità»
  - Mandatory/quasi-mandatory
  - Principle of collective financing with an individual saving + risk covering component
  - Privately managed
  - ▶ **Capital funding principle**
- **3<sup>rd</sup> = Private Savings**
  - At the discretion of every resident (partly tax-exempt): cash, securities, real estate, personal pension plans (i.e. 3<sup>rd</sup> pillar), life insurance etc.

## Three-Pillars System (3)

### Public (1<sup>st</sup>) Pillar (since 1948)

- Covers **retirement, death** (widows, widowers / orphans), **disability**
- **Compulsory** for all Swiss residents including self-employed people or people without gainful employment (e.g., stay-at-home parent)
- Redistribution system (= collective solidarity): **no individual saving** component
- Intended to cover **basic needs** (min. CHF 1'105.– to max. CHF 2'210.– per month), i.e. min. 28% to max. 56% if compared to an average income per month of about CHF 3'950 .–
- **Contributions:**
  - Salaried: fifty-fifty sponsor and employee (rate = 10.3% of annual salary)
  - Self-employed: 5.2 to 9.7% of annual income or minimum of CHF 475.– per year

## Three-Pillars System (4)

### Occupational (2<sup>nd</sup>) Pillar (since 1985)

- **Compulsory**
  - Partially based on the pre-existing voluntary occupational plans
  - Complimentary to 1<sup>st</sup> pillar
  - Mandatory for all salaried employees with annual income > CHF 20'880.–
  - Covers death (survivors), disability risks and retirement pension benefits
  - Along with 1<sup>st</sup> Pillar intended to cover approx. 60% of living costs (at retirement)
- **Quasi-compulsory**
  - Self-employed and all not compulsory insured people/workers may join a 2<sup>nd</sup> pillar pension fund scheme on a voluntary base.
- **Compulsory + voluntary pillar** (mixed plans)
  - Principle of minimum standard guaranteed by law but most sponsors provide better benefits than prescribed by legal provisions (“super-obligatory” benefits)



## Three-Pillars System (5)

### 2<sup>nd</sup> pillar: Organization of the pension plans

- Must be **legally independent** from any (public or private) sponsor company incl. asset segregation and own management.
- **Legal incorporation:** foundations (most frequent), cooperative associations, (autonomous) public institutions (for public sector employees)
- Must be registered with a **regulatory authority** (federal/cantonal)
- **Joint board** (sponsor + employee)
  - Equal number of sponsor's and employee's representatives in the pension plan's board, having the same rights and equal vote.
  - Election of the worker's representatives by direct vote or proxy voting (delegates).
  - Appointment of sponsor's representatives by company (members of sponsor company's management).
- **Independent auditors** recognized by regulatory authorities
- Qualified **pension experts** (for actuarial services)

## Three-Pillars System (6)

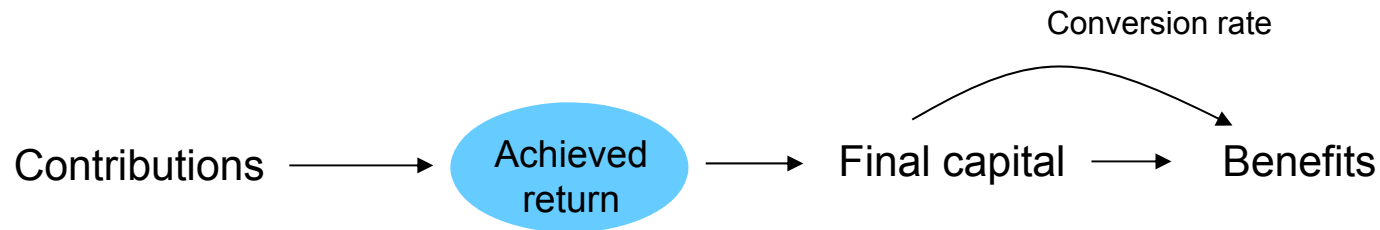
### 2<sup>nd</sup> pillar: Financing

- Financed through capital funding principle by **contribution of sponsor and employee...**
  - Sponsor's contribution at least 50% (mandatory by law)
  - Sponsor is free to contribute more into the fund
  - Contribution quotas vary from pension fund to pension fund (as an indication: usually 6% of the employee's salary + 6% from employer)
- ...and **return on investments**.
- If employee changes employer for other reasons than death, disability or retirement, he/she must also leave the pension fund.
  - Employee is entitled to withdraw benefits = "vested benefits"
  - Vested benefits will be transferred to new employer's pension fund
  - In case employee has not taken any new job the vested benefits will be transferred to a vested benefits account.

## Three-Pillars System (7)

2<sup>nd</sup> pillar: Plan types - Defined contribution plan

- Defined contribution plan

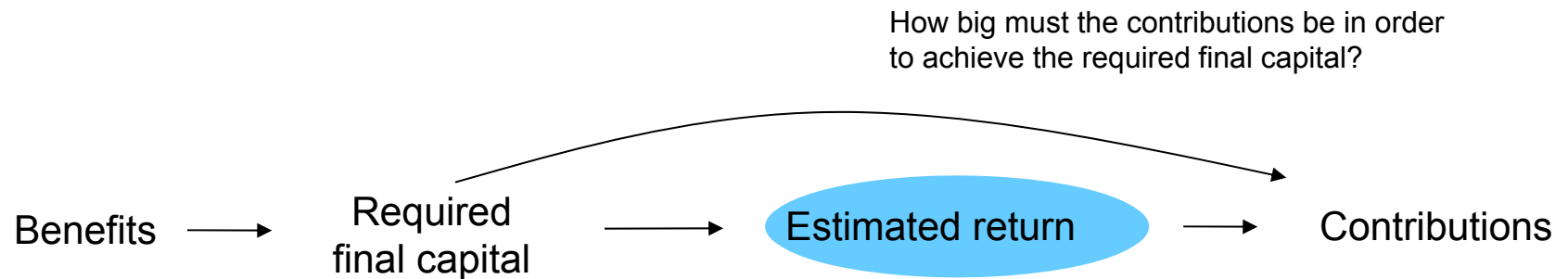


- Both the contributions and the return on the capital market define the benefits.
- There is no direct relation between pension and last salary.
- Buying into the pension plan is not mandatory.
- Guarantee of a retaining of the par value and a minimum interest (BVG minimum interest rate).

## Three-Pillars System (8)

### 2<sup>nd</sup> pillar: Plan types - Defined benefit plan

- Defined benefit plan



- The volume of the benefits defines the contributions.
- If the defined benefit is to be fully retained, the insured member or the sponsor must cover the costs.
- The calculation is based on average contribution rates.



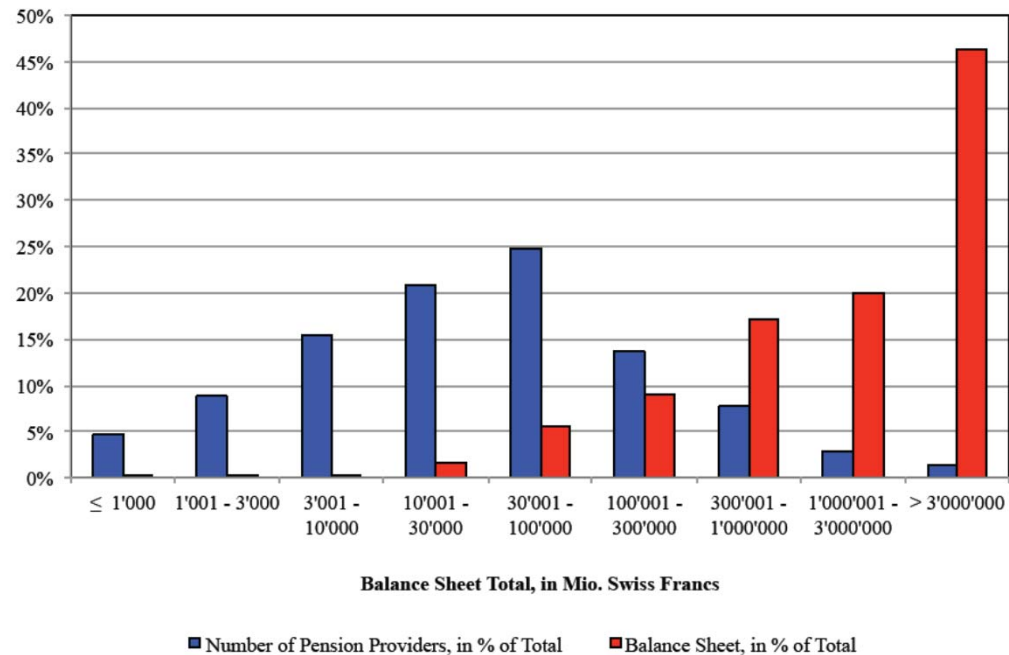
# Swiss II. Pillar

## Key facts

<b>Total number of Pension Funds</b>	<b>2'265</b>
<i>in defined contributions plan</i>	2'054 (90.7%)
<i>in defined benefits plan</i>	211 (9.3%)
<b>Number of active members</b>	<b>3'696'045</b>
<i>in defined contributions plan</i>	3'223'594 (87.2%)
<i>in defined benefits plan</i>	472'451 (12.8%)
<b>Balance Sheet total (in CHF Mio.)</b>	<b>621'234</b>
Swiss GDP (in CHF Mio.)	550'571
<i>Pension Funds' assets in % of Swiss GDP</i>	112.8%

Source: BFS, Pensionskassenstatistik 2011

Data as of 31.12.2010



Source: Barenco L., *Swiss Pension Funds' Liabilities Structure and Portfolio Risk: an Empirical Analysis*, University of Zurich, 2012

# Swiss legal environment

Legal Bases

Investment strategy

## Legal Bases (1)

### Investments guidelines (I)

#### Art. 50 OPP 2: Sicurezza e ripartizione dei rischi

1. *L'istituto di previdenza deve scegliere, gestire e controllare accuratamente gli investimenti che opera.*
2. *All'atto dell'investimento del patrimonio, l'istituto di previdenza deve assicurarsi che la sicurezza del conseguimento degli scopi di previdenza sia garantita. La sicurezza deve essere valutata segnatamente tenendo conto della totalità degli attivi e dei passivi, nonché della struttura e dell'evoluzione prevedibile dell'effettivo degli assicurati.*
3. *All'atto dell'investimento del patrimonio, l'istituto di previdenza deve rispettare i principi di una ripartizione appropriata dei rischi; i mezzi devono, in particolare, essere ripartiti tra diverse categorie di investimenti, nonché tra parecchie regioni e settori economici.*

## Legal Bases (2)

### Investments guidelines (II)

#### Art. 50 BVV 2 ‘Certainty and Risk Distribution’\*

- 1 *The pension fund must carefully select, manage and monitor its portfolio investments.*
- 2 *In investing the assets it must ensure that the certainty of fulfilling pension obligations is guaranteed. Evaluating the certainty specifically entails assessing total assets and liabilities as well as the structure and expected development of the portfolio’s insured persons.*
- 3 *In investing the assets it must observe the principles regarding an appropriate risk allocation; in particular, assets should be distributed across several investment categories, as well as across several regions and economic sectors.*

\* *Unofficial translation*



## Legal Bases (3)

### Objectives of a pension fund

- According to Art. 50 - 52 BVV 2 assets must be invested, carefully managed and monitored such that:
  - the contractual benefits can be paid out punctually (**liquidity risk**),
  - the fund-specific risk profile is complied with (**funding ratio risk**),
  - a performance in line with the market is still possible and sufficient to pay for benefits (**funding risk**) and
  - sufficient **diversification** between and within the various investment categories is guaranteed.

## Legal Bases (4)

### Art 54, 55 and 57 BVV 2: Investment limits

	Category total	Single participation
<i>Bonds</i>	100%	10%*
<i>Securitized assets</i>	50%	
<i>Equities</i>	50%	5%
<i>Real Estate</i>	30% (max. 1/3 abroad)	5%
<i>Alternative investments</i>	15%	
<i>Foreign holdings, non-hedged</i>	30%	

\* Excluding claims to the Swiss Confederation, to the Swiss mortgage institution, to Swiss Cantons or Municipalities or claims relative to collective insurance contracts.

<i>Investments to employer</i>	5%	
<i>additional investments in <b>real estates</b> owned for more than 50% of the value by the employer</i>	5%	

## Investment strategy (1)

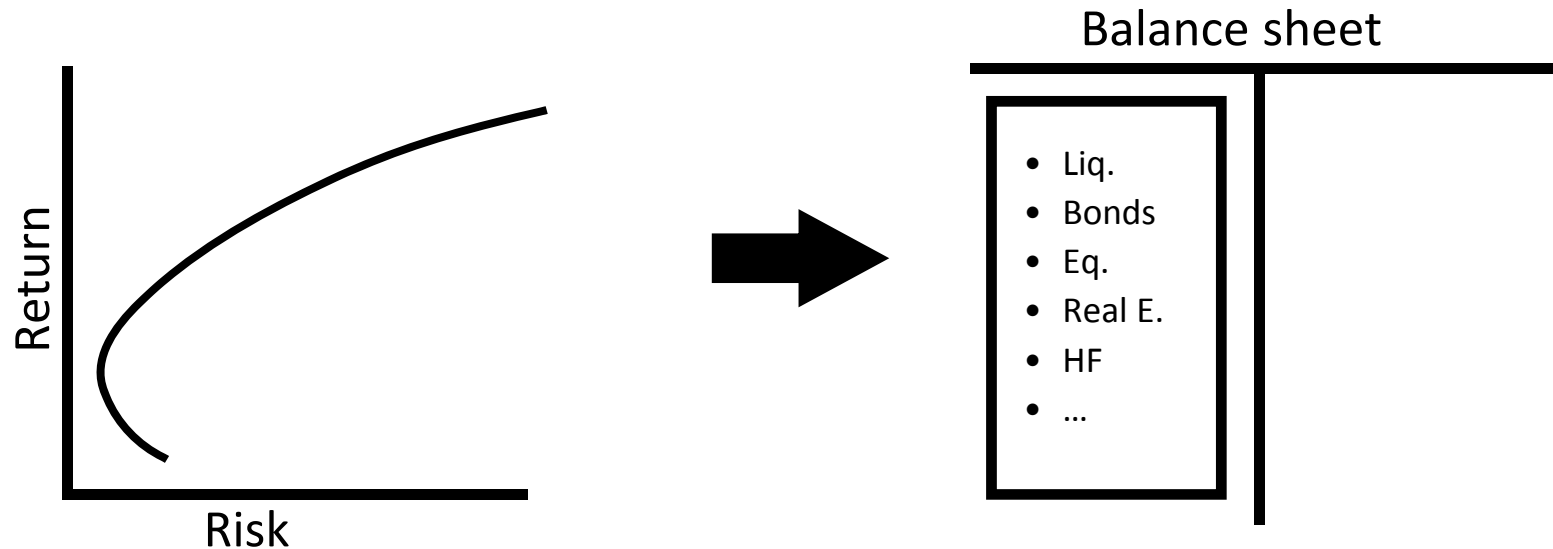
### Investment risk profile

- It measures the level of investment risk that the pension fund can incur. It is defined by both the structural and financial risk profile.
- The more effectively the pension fund can react to a changed financial situation (effectiveness of recapitalisation measures resp. pension benefit adjustments), the higher the **structural risk profile**.
- The better the fund is able to cope with asset volatility, i.e. the greater the excess of net assets over actuarial reserves (level of volatility reserves), the higher the **financial risk profile**.

## Investment strategy (2)

The “Asset only” method

Development of an optimised portfolio without taking into account the liabilities:

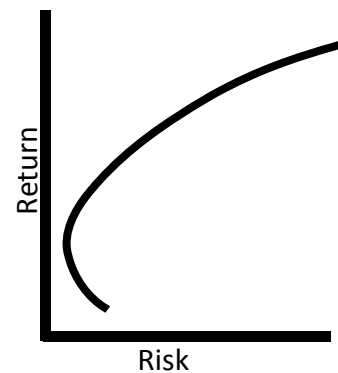




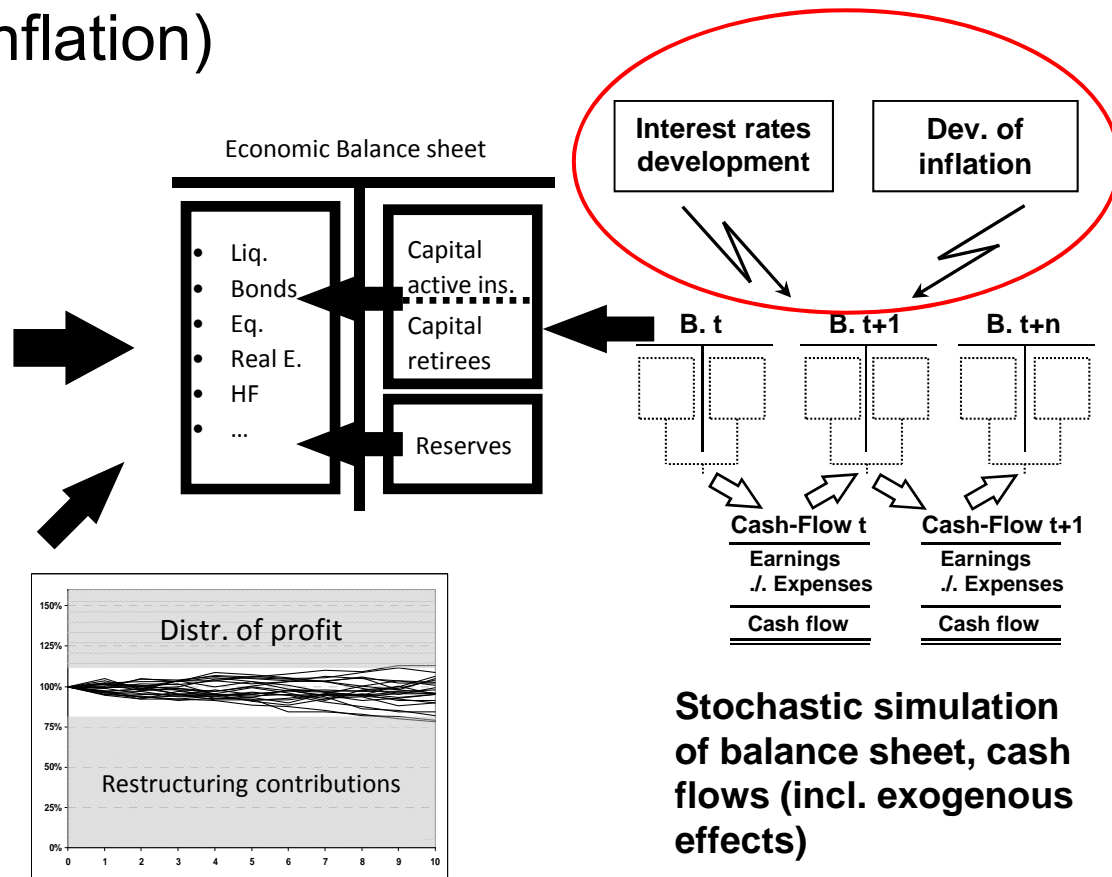
## Investment strategy (3)

ALM: Capital market based dynamic Method

Economic valuation of the liabilities (risk-free) plus simulation of exogenous factors (e.g., development of interest rates or inflation)



Path depending on simulation of the funding ratio



# Swiss legal environment

## Summary

- Swiss legislation prescribes pension funds to use an **ALM method**, and not the «Asset only»
- The «*Prudent Investor Rule*» is the most important guideline while investing, not the investment limits
- The investment strategy should be developed according to the **specific** risk profile / risk capacity of the pension fund, which can be split in two main categories:
  - *Demographic / Structural risk profile*;
  - *Financial risk profile* (see the difference between actuarial and economic Funding Ratio later on)
- Great importance is given to an **accurate portfolio diversification** (i.e. the only «*free lunch*»)

# Funding Ratio

Balance Sheet

Actuarial Interest Rate

Actuarial Funding Ratio

Economic Funding Ratio

# Funding Ratio (1)

## Introduction: actuarial interest rate

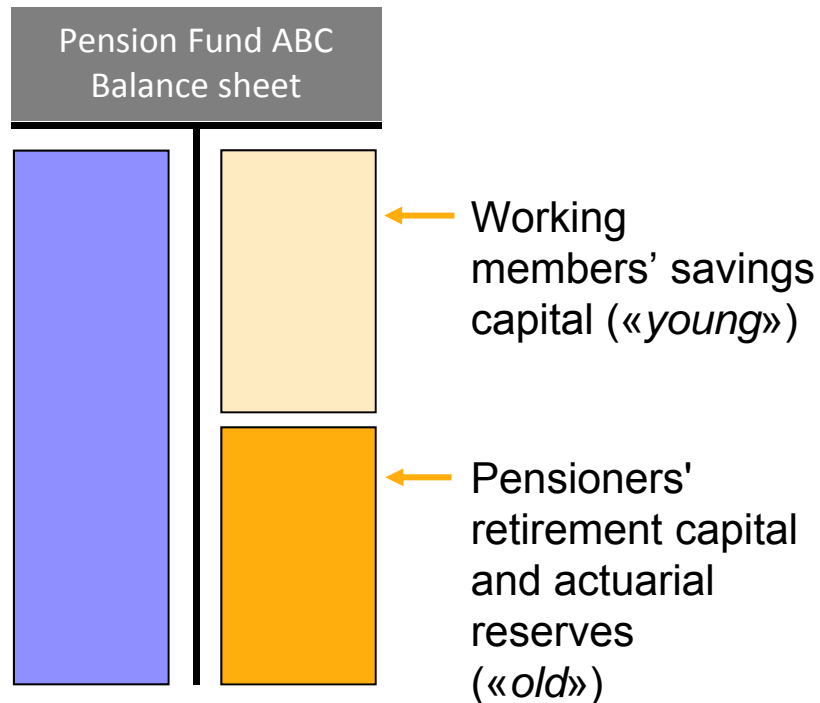
- The actuarial interest rate has (simplifying) two main functions:
  - **Compensation:** rate at which the pensioners' retirement capital is remunerated
    - Please note that pensions once fixed can't be modified (only "new" pensions can be changed)
  - **Discounting:** discounting factor for future benefits while computing the present value of the pensioners' retirement capital (and that of the working members too under defined benefits plans)
- The actuarial interest rate is usually higher than the risk free rate.
- Moreover, as it will be explained later on, the actuarial interest rate is a fundamental factor while calculating the **present value of the liability** and the **minimum return**.



## Funding Ratio (2)

### Balance Sheet

- Balance sheet: **funding ratio** Swiss Pension Funds



→ **Funding Ratio:**  
Assets / Liability \* 100

#### Assets

- Valuation at market values («*True and fair*»)

#### Liability

- Present value of the future expected Liability of the Pension Fund

Most important parameters for the valuation:

- Regulations**
- Mortality Tables resp. actuarial parameters**
- Discount interest rate**

## Funding Ratio (3)

### Overview Swiss II. Pillar (I)

- Swiss Pension Funds: published **(actuarial) Funding Ratio**

## Funding Ratio (4)

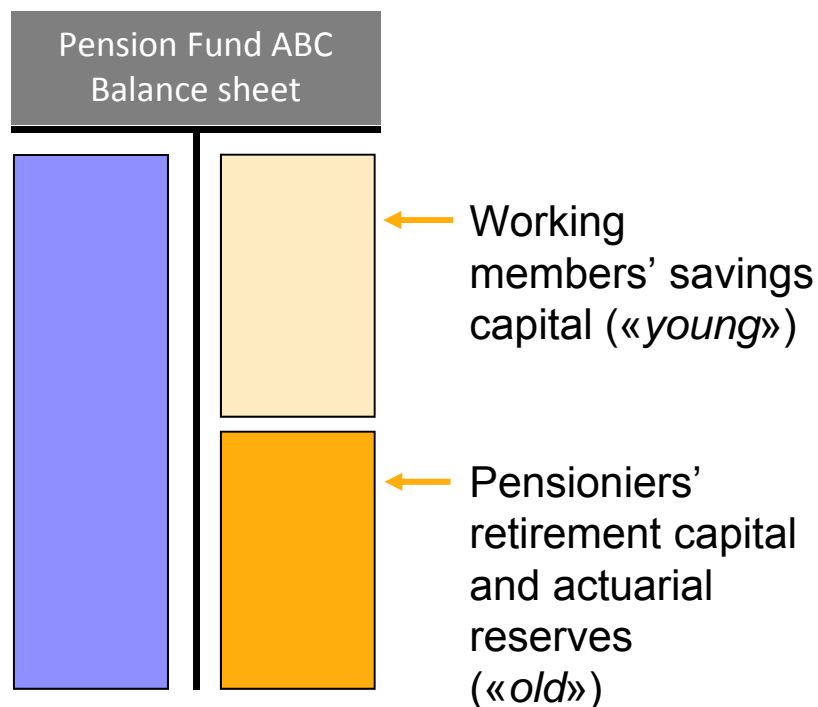
### Overview Swiss II. Pillar (II)

- The picture shows that private pension funds have, in general, **higher funding ratios** than public pension funds.
  - On average, after the subprime crisis (2008) the funding ratio of Swiss pension funds is below 100%, i.e. (at the 31.12.2011) 97% (3% underfunding).
- **Can we say that the situation is fine?**
- Note that the good performance on the asset side of the balance sheet is due to decreasing nominal interest rates...
- ... **is the current technical (actuarial) valuation still ok?**

## Funding Ratio (5)

Actuarial discount of the Liability (I)

- Balance sheet: **Actuarial Funding Ratio**



### Example Pension Fund ABC **Assets**

- Market Value (t) = 100

### **Liability**

- Discounted at a fix actuarial interest rate
- Expected Liability in one year (pensioners; t+1): 104
- Actuarial interest rate: 4%
- Present value (t): 100  

$$= (104) / (1+4\%) = 100$$

→ **Funding Ratio (t):**

$$(\text{Assets}) \text{ 100} / (\text{Liability}) \text{ 100} * 100 = \underline{\underline{100\%}}$$

## Funding Ratio (6)

### Actuarial discount of the Liability (II)

- **Actuarial interest rate** used by Swiss pension funds.

The actuarial interest rate is freely chosen by the pension fund, as it is **not directly set by law**.

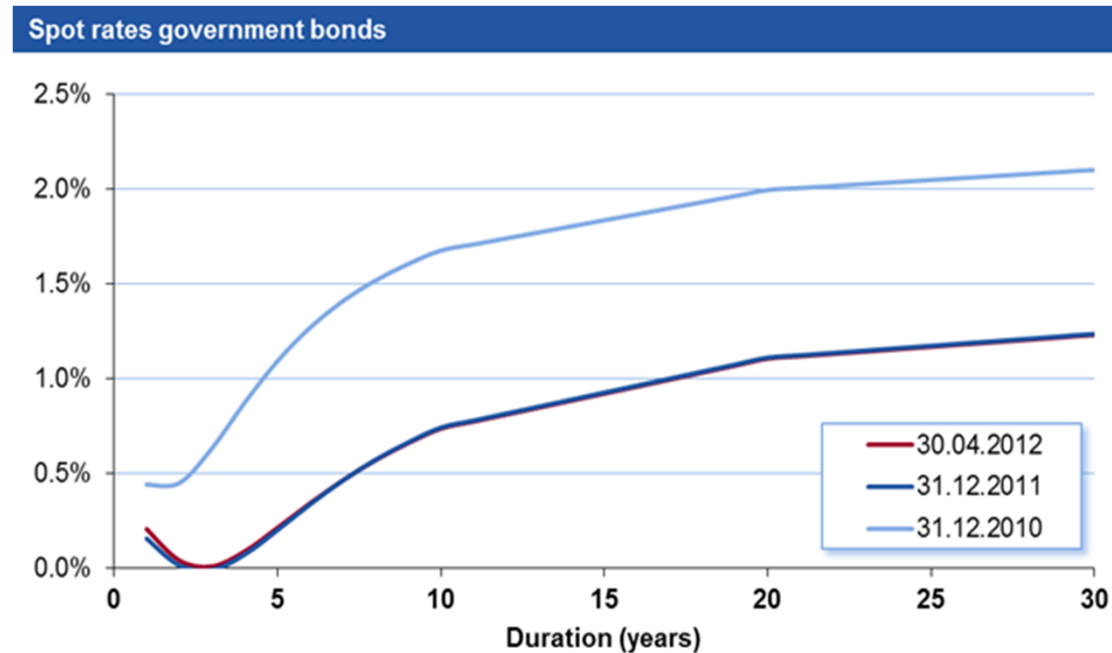
As of 31.12.2010 it was, on average, **about 3.5%**.

In general, public pension funds use a **higher** actuarial interest rate (than private PFs).

## Funding Ratio (7)

### Spot rates Swiss Government Bonds

- Spot rates **Swiss Government Bonds**



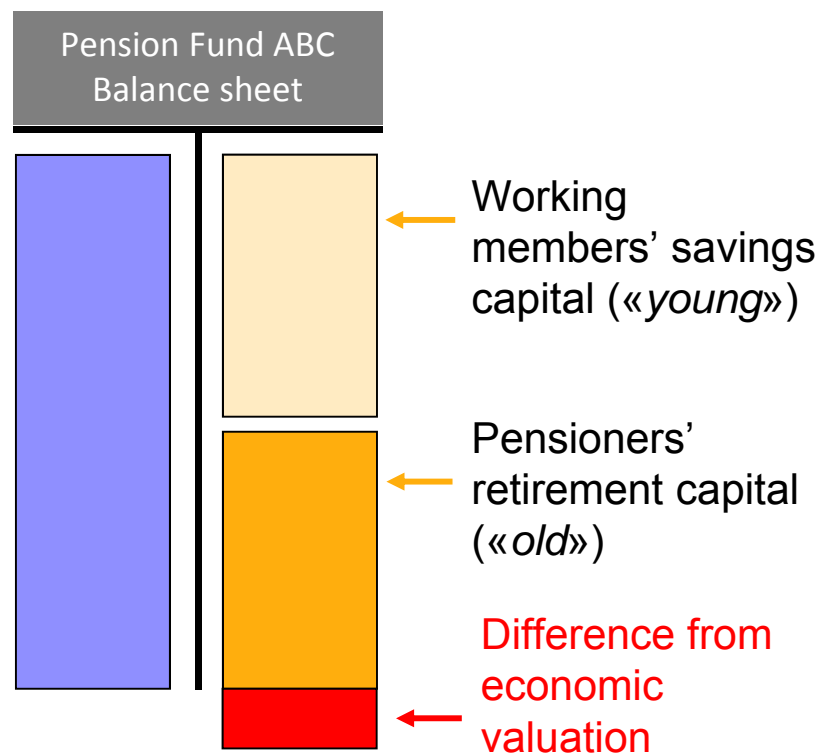
- Yield to maturity (*10 years Bond*): **about 0.8% p.a.**
- Interest rates at a historical minimum
- Actuarial interest rate > Spot rates**



## Funding Ratio (8)

### Economic discount of the Liability

- Balance sheet: **Economic Funding Ratio**



#### Example Pension Fund ABC

##### Assets

- Market Value (t) = 100

##### Liability

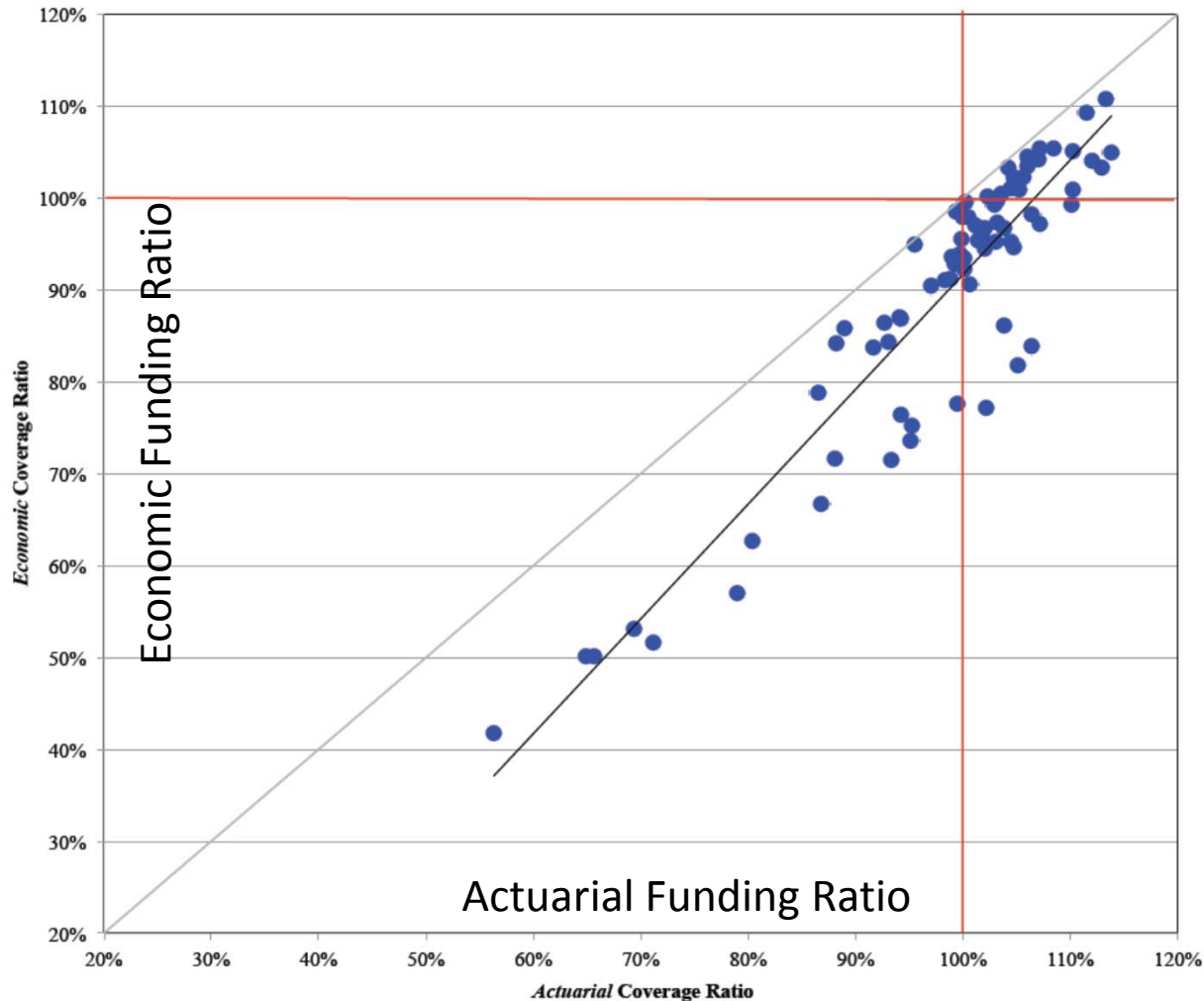
- Discounted at “*risk free*” interest rates (by law, pensions can’t be modified!)
- Expected Liability in one year (pensioners; t+1): 104
- Spot rates: < 0.2%
- Present value (t): 103.8  
=  $(104) / (1+0.1\%) = 103.8$

#### → Funding Ratio (t):

$$(\text{Assets}) 100 / (\text{Liability}) 103.8 * 100 = \underline{96\%}$$

# Funding Ratio (9)

## Actuarial vs Economic Funding Ratio (I)



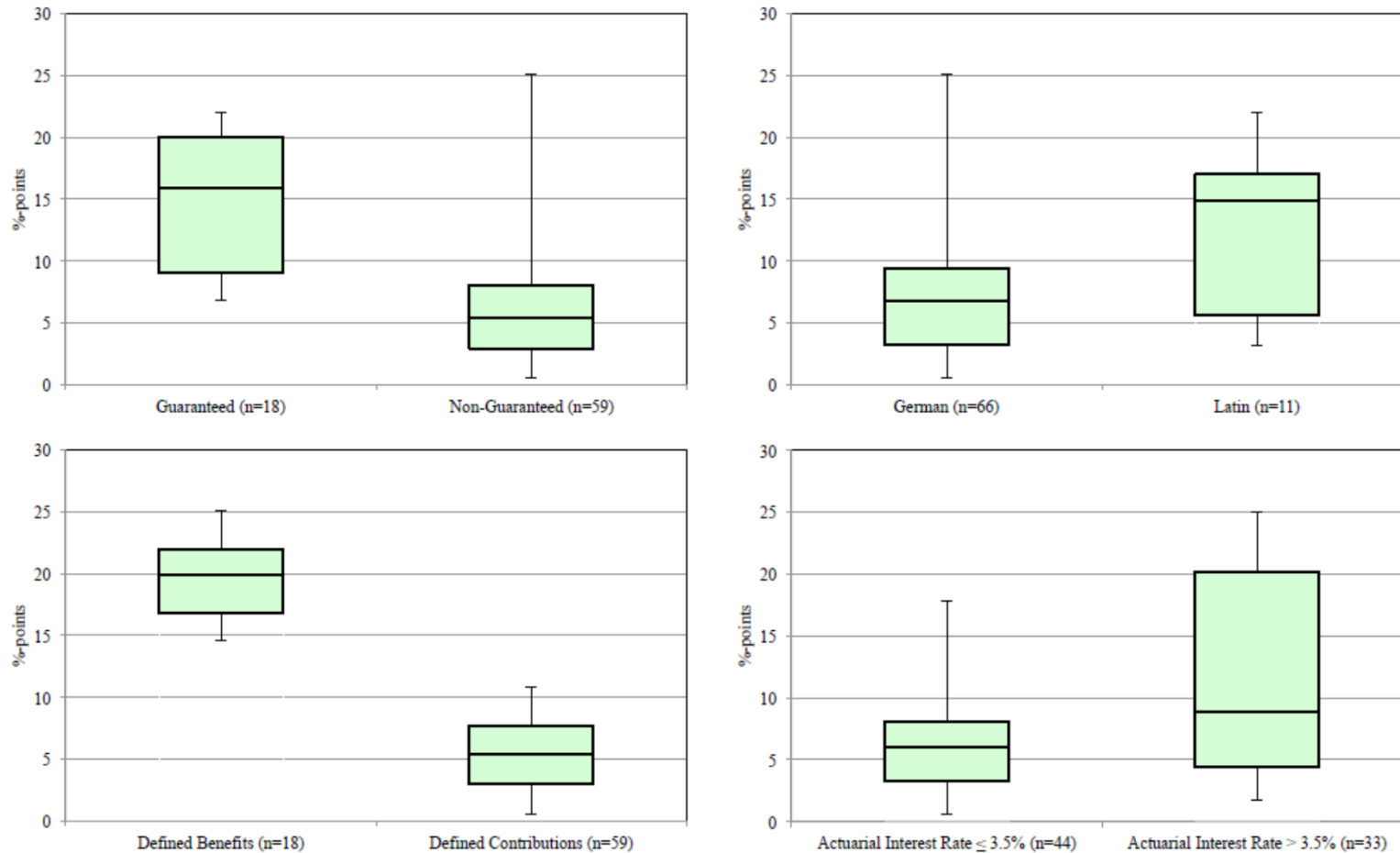
Function:  
 $y=1.2x-0.3$ ,  
 $R^2=0.8$

Example:  
 Act. FR =  
 100%  
 →  
 Econ. FR =  
 $1.2 \cdot 100\% - 0.3$   
 =  
 90%

Source: Barenco L., *Swiss Pension Funds' Liabilities Structure and Portfolio Risk: an Empirical Analysis*, University of Zurich, 2012

# Funding Ratio (10)

## Actuarial vs Economic Funding Ratio (II)



Source: Barenco L., *Swiss Pension Funds' Liabilities Structure and Portfolio Risk: an Empirical Analysis*, University of Zurich, 2012

## Funding Ratio (11)

### Actuarial vs Economic Funding Ratio (III)

- While considering a sample of 77 Swiss pension funds, **no one** has the economic funding ratio higher than the actuarial funding ratio.
- This is due to the financial environment in which pension funds operated in 2010: **market rates** (used in the economic setting) were (and still are) **lower** than actuarial interest rates.
- This implies that the actuarial funding ratio **overestimates** the actual financial situation of the pension fund. This is reflected in a value of the pensioners' retirement capital (liability) that is **too low** (discounted with an interest rate higher than the market).

## Funding Ratio (12)

### Actuarial vs Economic Funding Ratio (IV)

- The Swiss legislation states that the investment strategy should be set **according** to the specific demographic and financial risk profile of the pension fund.
- Instead, following the conclusion of the work done in collaboration with the University of Zurich (*Barenco, 2012*), it seems that the **demographic risk profile does not affect the investment strategy** of pension funds.
- On the other hand, the **financial risk profile has a negative effect on the choice of the strategy** (i.e. pension funds with a lower financial risk profile tend to invest in a more risky way). Probably, this can be explained by the will to restore the financial situation of a pension fund through an «aggressive» investment strategy.

# Performance Swiss Pension Funds

Asset Allocation

Past Return



# Performance Swiss Pension Funds (1)

## Asset Allocation Evolution

- Evolution of Swiss pension funds' asset allocation

Alternative Investments: 5%

Real Estate: 21%

Equities: 27%

Cash & Bonds: 44%

## Performance Swiss Pension Funds (2)

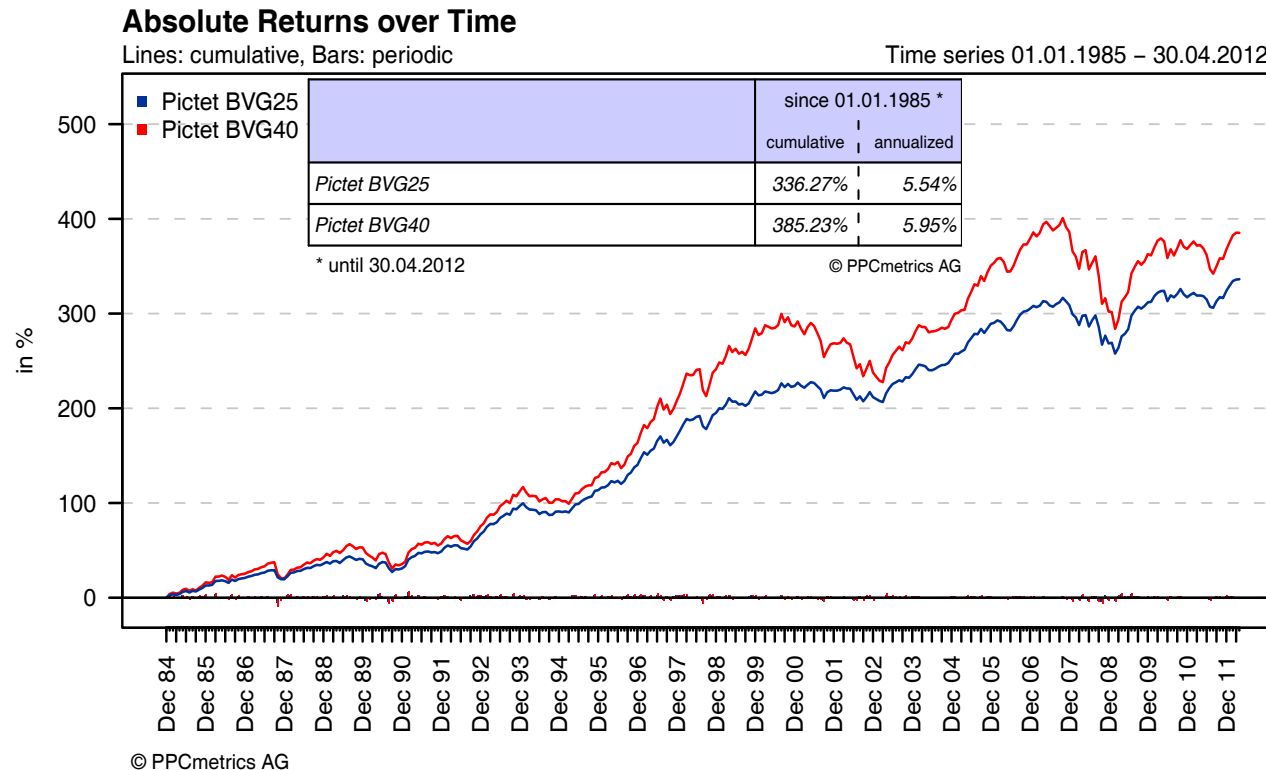
### Asset Allocation bandwidth

- Swiss pension funds' asset allocation (with bandwidth)

# Performance Swiss Pension Funds (3)

## Performance Pictet Index LPP 25 and LPP 40 (I)

- Performance of Swiss pension funds (since 1985)

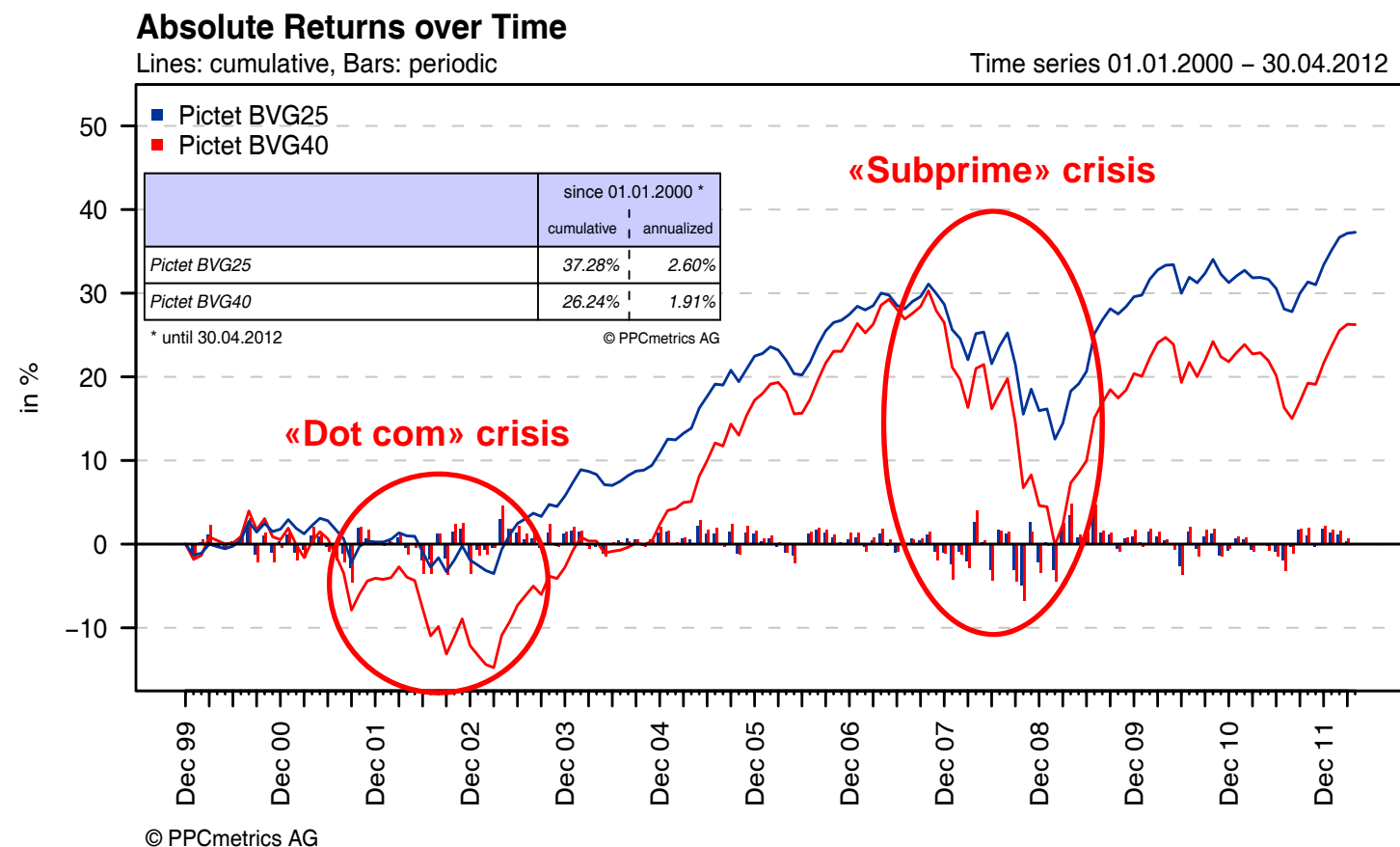


- Pictet LPP Index are **mixed balanced portfolios** often used as proxy for pension funds' strategies. The 25 and 40 represent the share of equities in the index.

# Performance Swiss Pension Funds (4)

## Performance Pictet Index LPP 25 and LPP 40 (II)

- Performance Swiss pension funds (since 2000)



## Performance Swiss Pension Funds (5)

### Performance PFs vs minimum rate

- Return of Swiss pension funds since 2000 and cumulated return of the LPP minimum rate.

Since 2000,  
pension  
funds failed  
to reach the  
objective.

- The LPP minimum rate is the rate, defined by the Swiss government, at which the working member's saving capital ("obligatory parts") has to be remunerated. It is the minimum rate of return imposed by law.

## Performance Swiss Pension Funds (6)

### First conclusions

- Pictet LPP Index are considered as a proxy for pension funds' strategies
- Since 1985 (year of the introduction of the LPP) the return of the index is 5.54% p.a. (25% equities share) resp. 5.95% p.a. (40% equities share): on average, the required return has been reached
- However, since 2000 the return is 2.60% p.a. (25% equities share) resp. 1.91% p.a. (40% equities share): below both the required return and the LPP minimum rate

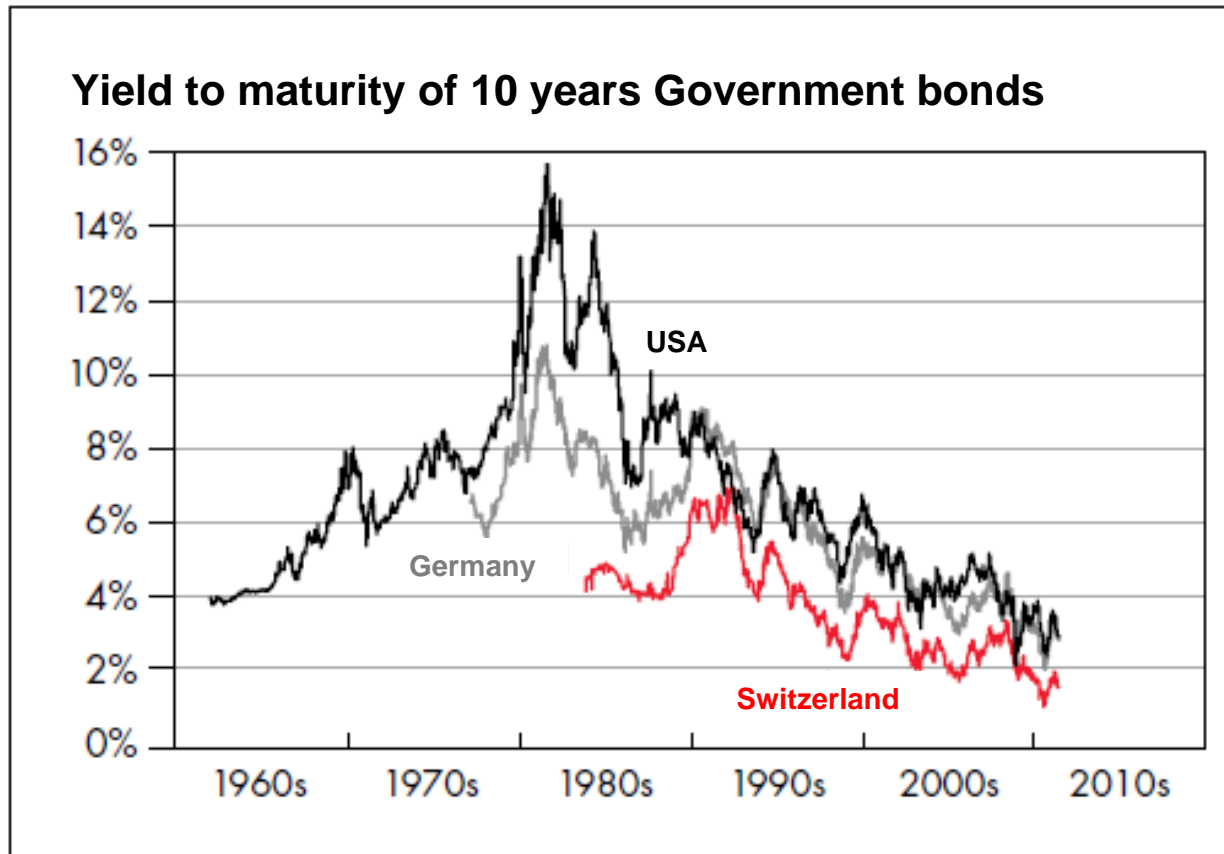
**→ Pension funds have to build up (in good times) fluctuation reserves!**



# Performance Swiss Pension Funds (7)

## Performance drivers (I)

- Performance drivers

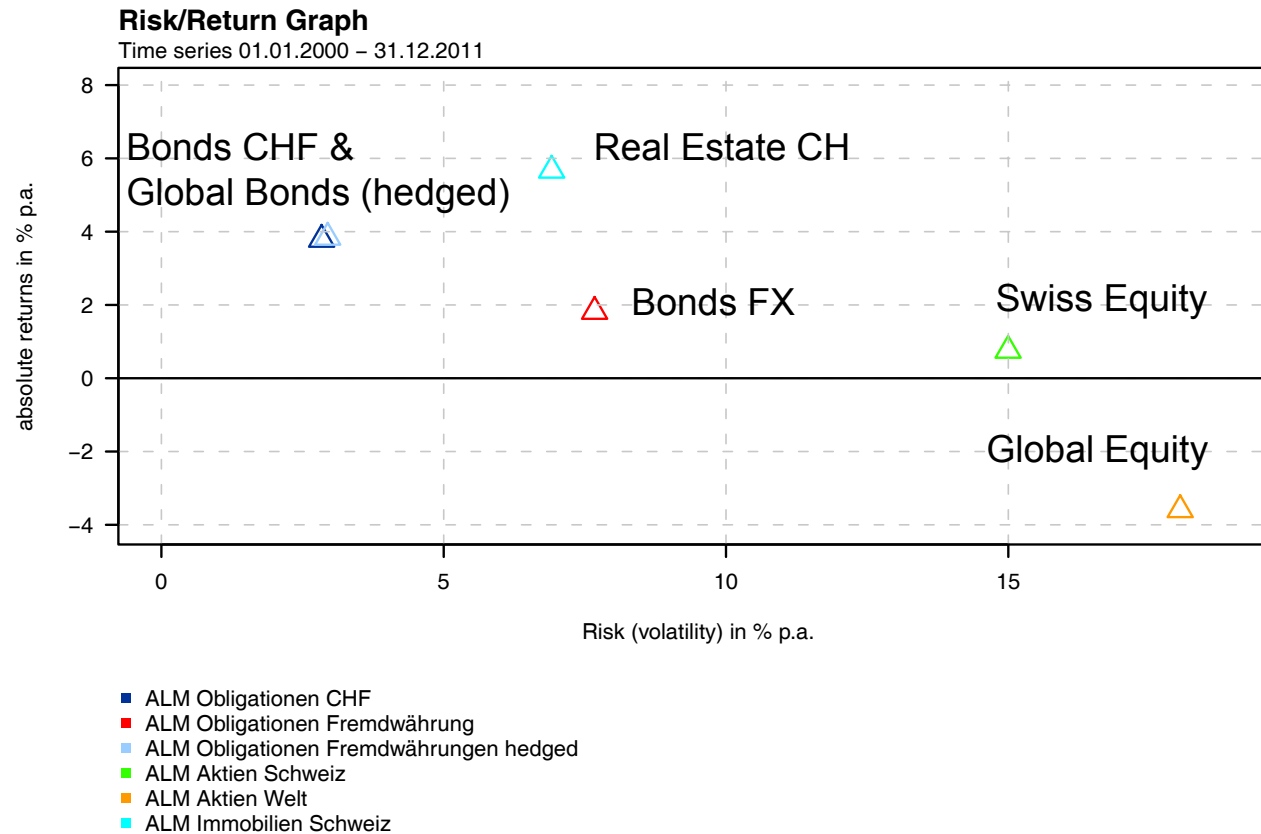


Since the 1980s, we are experiencing a general decrease in interest rates

# Performance Swiss Pension Funds (8)

## Performance drivers (II)

- Risk/Return: Asset Classes (since 2000)



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## Performance Swiss Pension Funds (9)

### Performance drivers (III)

- Given the interest rate environment at the moment of the introduction of the LPP (1985), it was basically possible for pension funds to finance the benefits **without taking any risk** (*liability matching*).
- The continuous **decrease** in interest rates created important return on the price of bonds (capital gain), **but**, at the same time, pushed the interest rates at a **historical minimum**.
- As a consequence, in the future, the return of the bond's segment is expected to be very low.

## Performance Swiss Pension Funds (10)

### Performance drivers (IV)

- Therefore since the middle of the 1990s, under these conditions, financing a required return  $> 4\%$  (= actuarial interest rates + administration and asset management costs + longevity provisions) is **no more possible** without incurring in “some” risks.
- In order to reach the above mentioned required return, pension funds have to strive for an **equity risk premium** (note that adding a risk component in the portfolio was not the idea of the lawmaker at the introduction of the LPP...).
- ... but in the period 2000 - 2011 even the equity risk premium was **negative**...

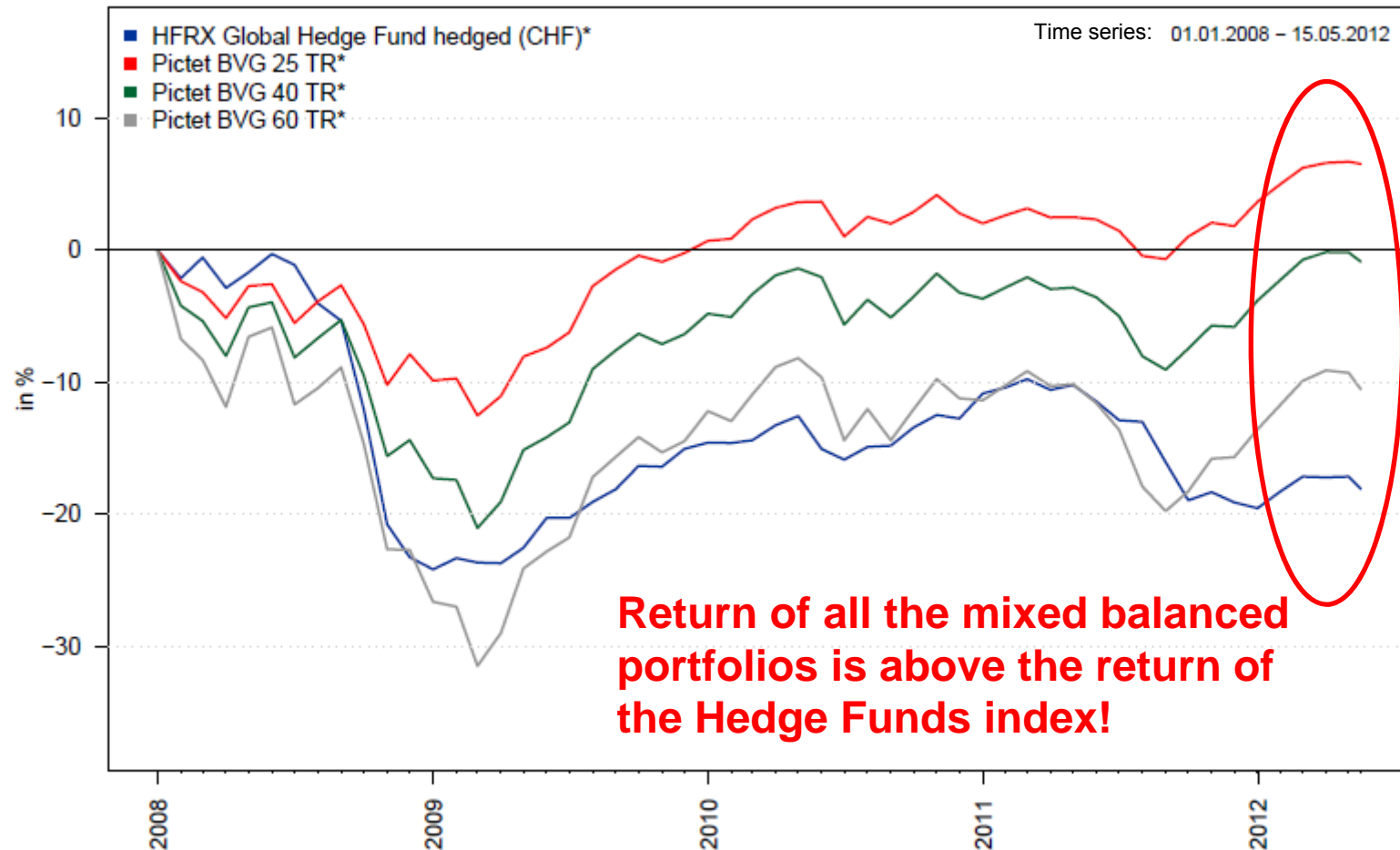
## Performance Swiss Pension Funds (11)

### Performance drivers (V)

- Thus, are Swiss pension funds' returns too low?
- Note that both returns and liabilities are calculated in **CHF**, so that no effect could be addressed to the currency (and the exchange rate).
- Moreover, note that on average, since 2000, Switzerland has been experiencing an inflation of about **0.80% p.a.**
- What could be the solution? Absolute return strategy?
  - Hedge Funds Absolute return, “all weather” features, ...

# Performance Swiss Pension Funds (12)

Swiss pension funds vs. Hedge Funds (I)





# Performance Swiss Pension Funds (13)

## Swiss pension funds vs. Hedge Funds (II)

Mixed balanced portfolio vs Hedge Fund portfolio, both in EURO:

Portfolio	Hedge Funds	Balanced Portfolio
<b>HFRI Div. FoF Index</b>	<b>100%</b>	
<b>Bonds</b>		<b>50%</b>
- EUR		25%
- World ex EUR		25%
<b>Equity</b>		<b>50%</b>
- World		
Total	100%	100%

Distribution Analysis	Hedge Funds Portfolio	Balanced Portfolio	Delta
Period	Jan 94 - Dec 2011	Jan 94 - Dec 2011	
Observations	215	215	
Return p.a.	4.04%	5.46%	1.42%
Volatility p.a.	11.88%	8.51%	3.37%
Min. monthly return	-10.50%	-6.00%	4.50%
Max. monthly return	10.47%	6.43%	4.04%
Positive months in %	52.56%	59.07%	6.51%
Return-Risk Coefficient	0.34	0.64	0.3
Skewness	0.18	-0.17	0.35
Kurtosis	3.58	2.76	-0.82
Max. Draw-down	-25.22%	-26.61%	1.39%

## Performance Swiss Pension Funds (14)

Swiss pension funds vs. Hedge Funds (III)

- If a diversified portfolio is used as a benchmark, Hedge Funds do **not** generate a significant positive alpha anymore.
- However, by considering other benchmarks, other conclusions will occur.
- As the example has shown, the **return p.a. of the diversified portfolio is superior to the Hedge Funds' return.**

# Required Return

## Required return (1)

### Required Return (Liability)

- In 2011, Swiss pension funds **required returns** ranged between **4.4%** and **4.8%**.

#### Required return

≈

Technical Interest

+

Administration costs

+

Asset management  
costs

+

Longevity provisions

## Required return (2)

How realistic is it?

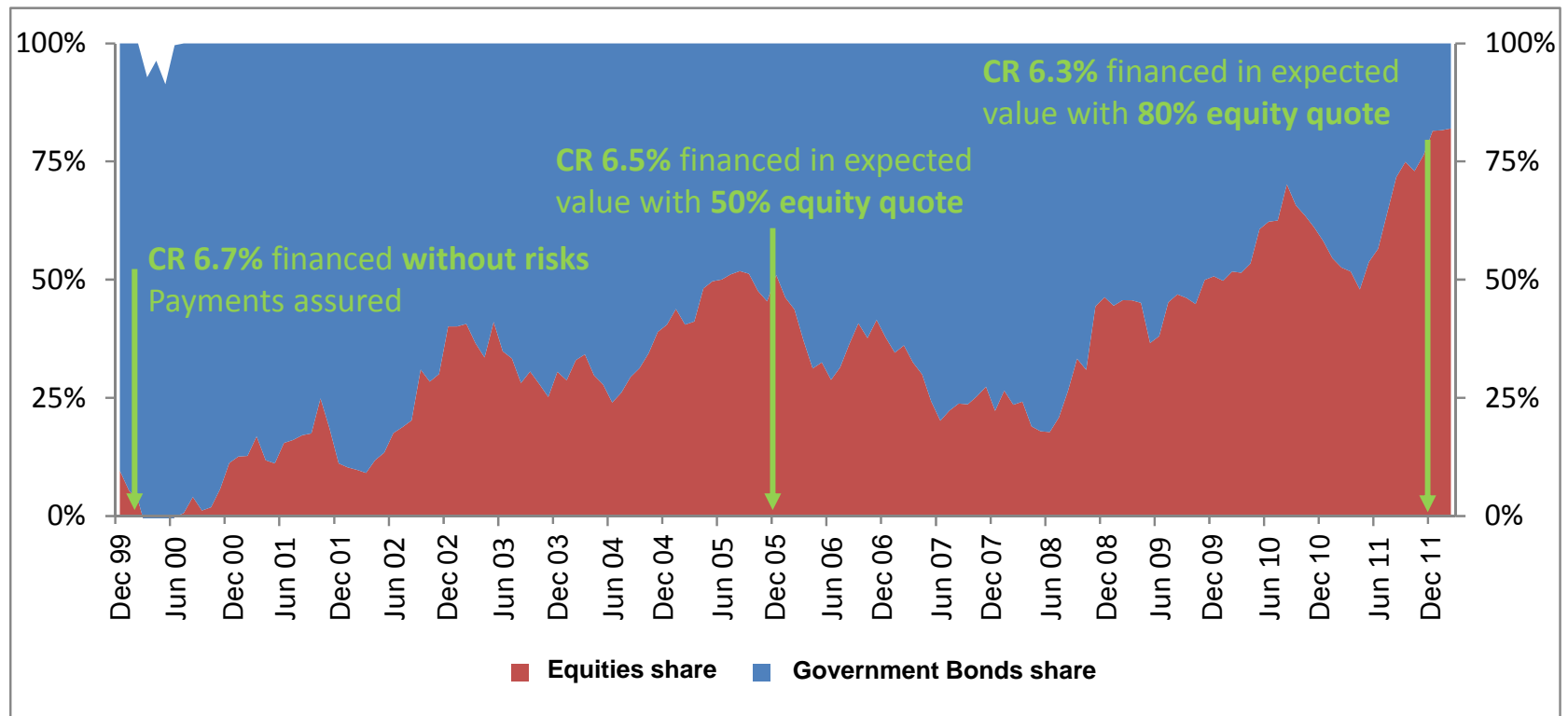
- Could the required return be reached in the financial market resp. could the «*third payer*»\* achieve the expected contribution rate?

\* In general, the return on the financial market is defined as the «*third payer*», beside employee's and employer's contributions.

## Required return (3)

Portfolio with an expected return of 4%

- Constitution of a portfolio of **government bonds** and **equities** (assumption: equity premium 4%) in order to finance a determined **conversion rate (CR)**



Source: SNB, Calculation PPCmetrics

## Required return (4)

### First conclusions

- **Know your “real” liabilities** → valuation at economic value
- Strategy based on **ALM methods**, and not on «Asset only» method
- **Strategy** is the most important decision for a pension fund
- **Diversification** is the one and only «*free lunch*»
- Promise only what you can fulfil by means of **risk free investments**
- Otherwise develop a **risk budget** and find appropriate **sponsors** in case of an underfunding



# Investment Process

Investment strategy  
Tactical asset allocation  
Portfolio management

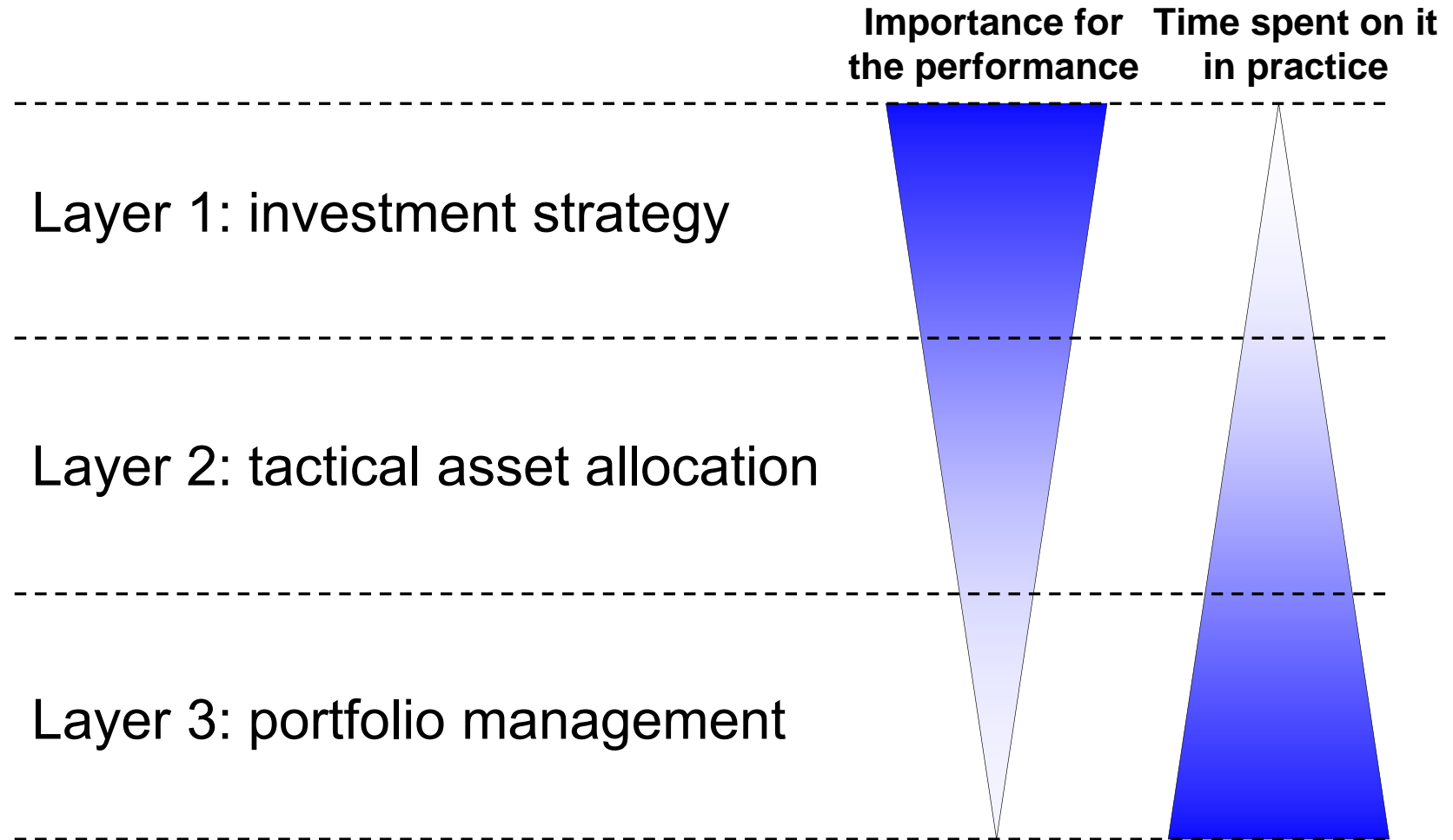
# Layers of the investment process (1)

## Introduction



## Layers of the investment process (2)

### Importance of the layers



# Investment strategy (1)

## Empirical evidence

Four empirical studies examined the importance of the strategic asset allocation:

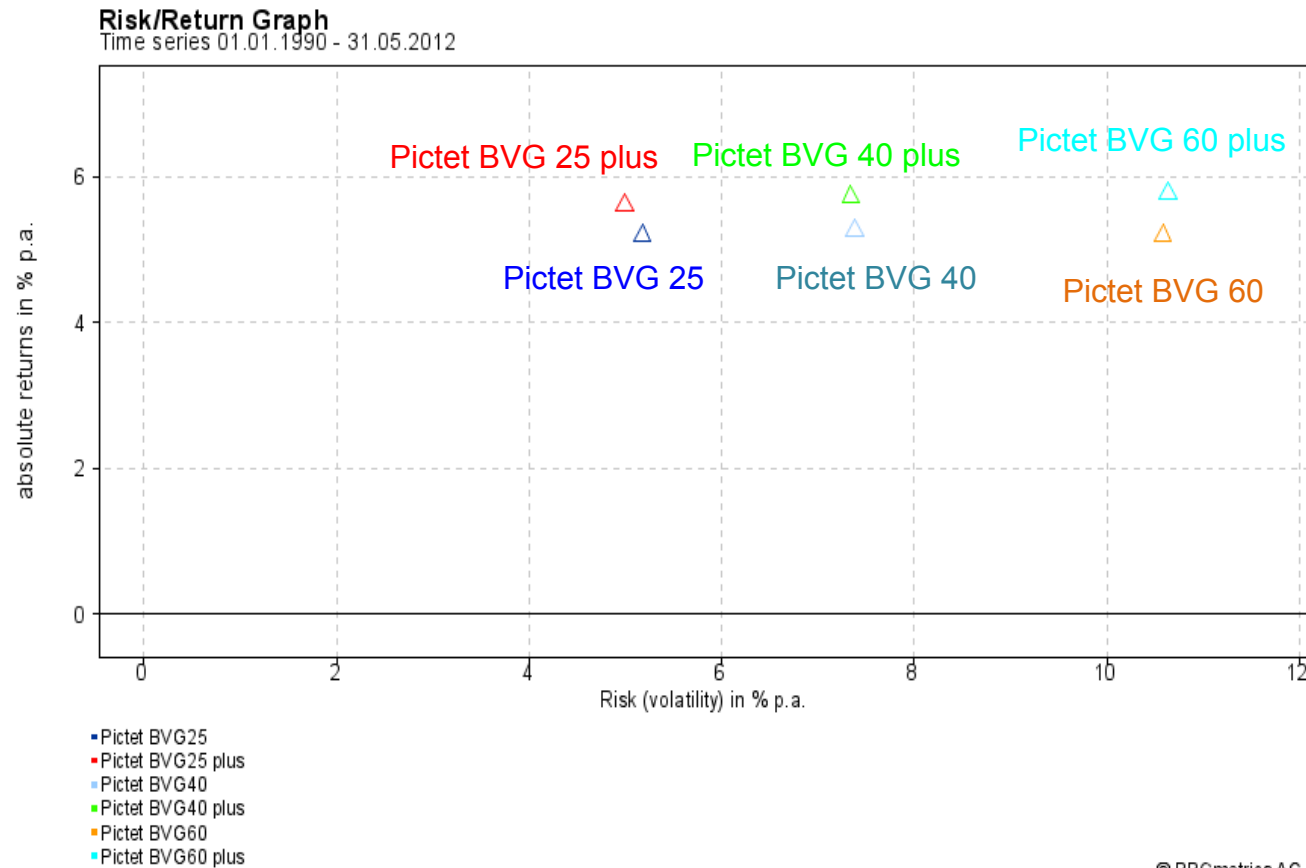
Study	Return			Impact of Strategic Asset Allocation on	
	Active*	Strategy	Total	Variability of Returns over Time	Return Level (Strategy/Total)
Brinson, Hood, Beebower	-1.1%	10.1%	9.0%	94%	112%
Brinson, Singer, Beebower	-0.1%	13.5%	13.4%	92%	101%
Ibbotson, Kaplan	-0.3%	7.0%	6.7%	81%	104%
Drobetz, Köhler	-2.4%	9.3%	7.0%	83%	134%

\* Timing and Selectivity

- More than 80% of the variability of returns over time is explained by the strategy!
- Active deviations had difficulties to create an added-value.

## Investment strategy (2)

Pictet Index LPP 25, 40 and 60 (incl. plus)



«Plus-Indices»: Incl.  
Real Estate, Hedge  
Funds and Private  
Equity

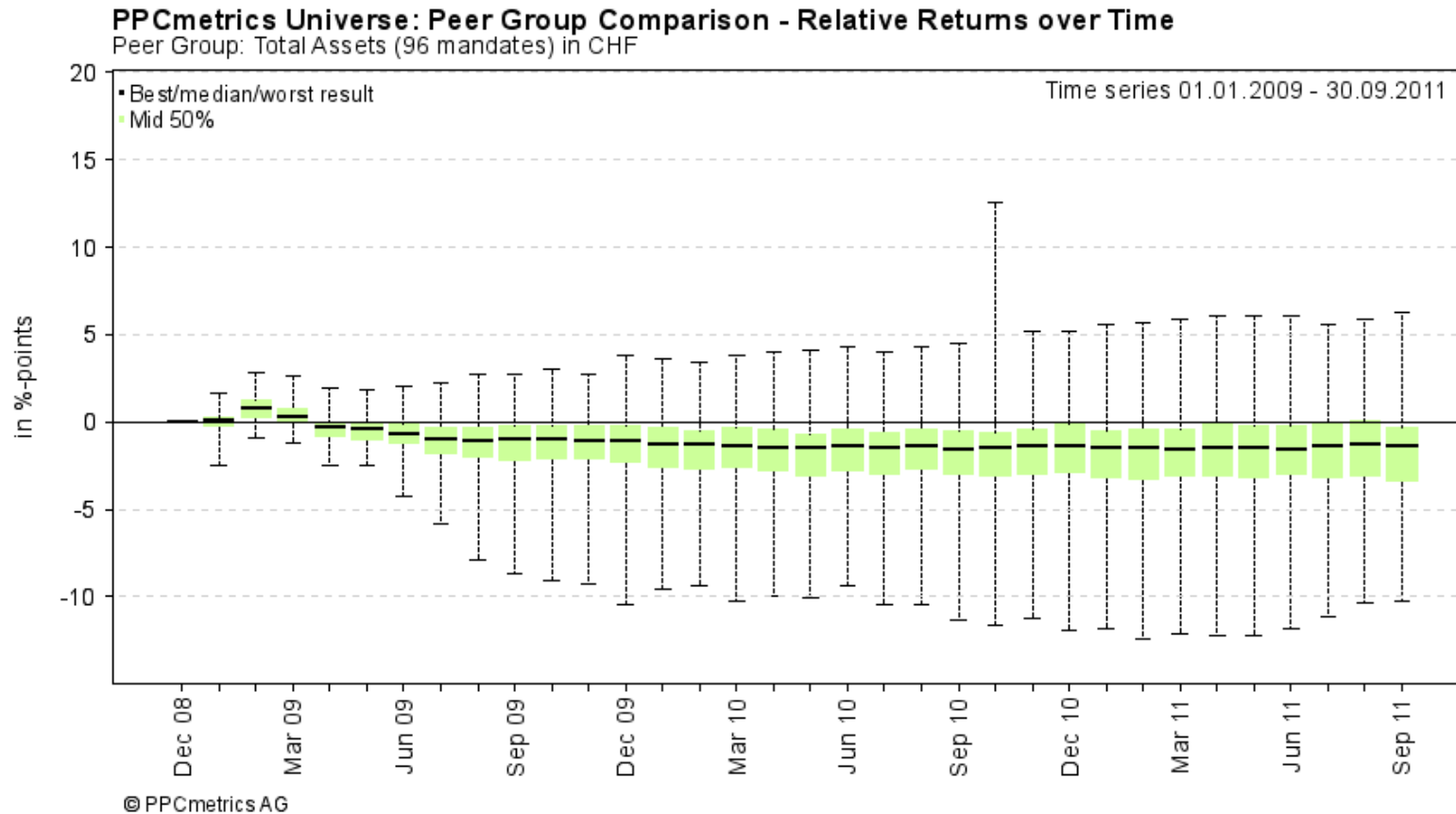
Source:  
[www.pictet.ch](http://www.pictet.ch)

- The **equity quote** is the most important driver of the risk/return profile of a strategy.

## Investment strategy (3)

Data about Swiss pension funds

### Importance of the investment strategy



## Investment strategy (4)

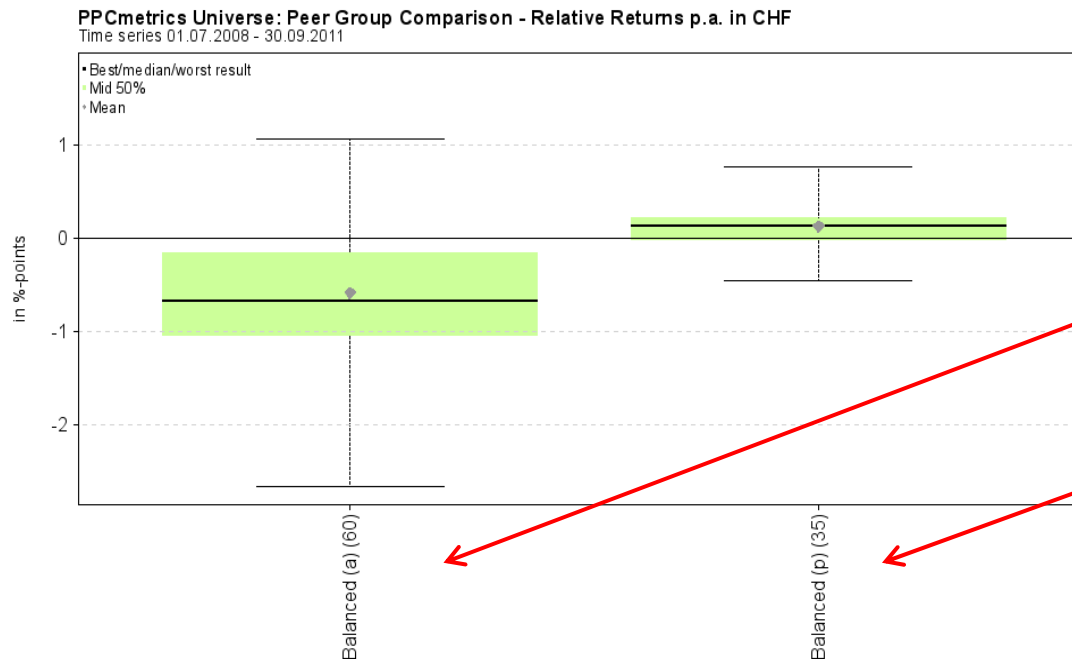
### Conclusions

- The **choice of the asset classes** and the fixing of the **strategic weights** (investment strategy) is the most significant factor for the performance on the total portfolio level.
- Therefore, the **market risks** need to be monitored with priority within the **ALM process**.
- The **strategic asset allocation** should be based on the **investment objectives** and the **risk capacity** (liabilities) of the pension fund.



# Strategy Implementation (1)

## Tactical asset allocation

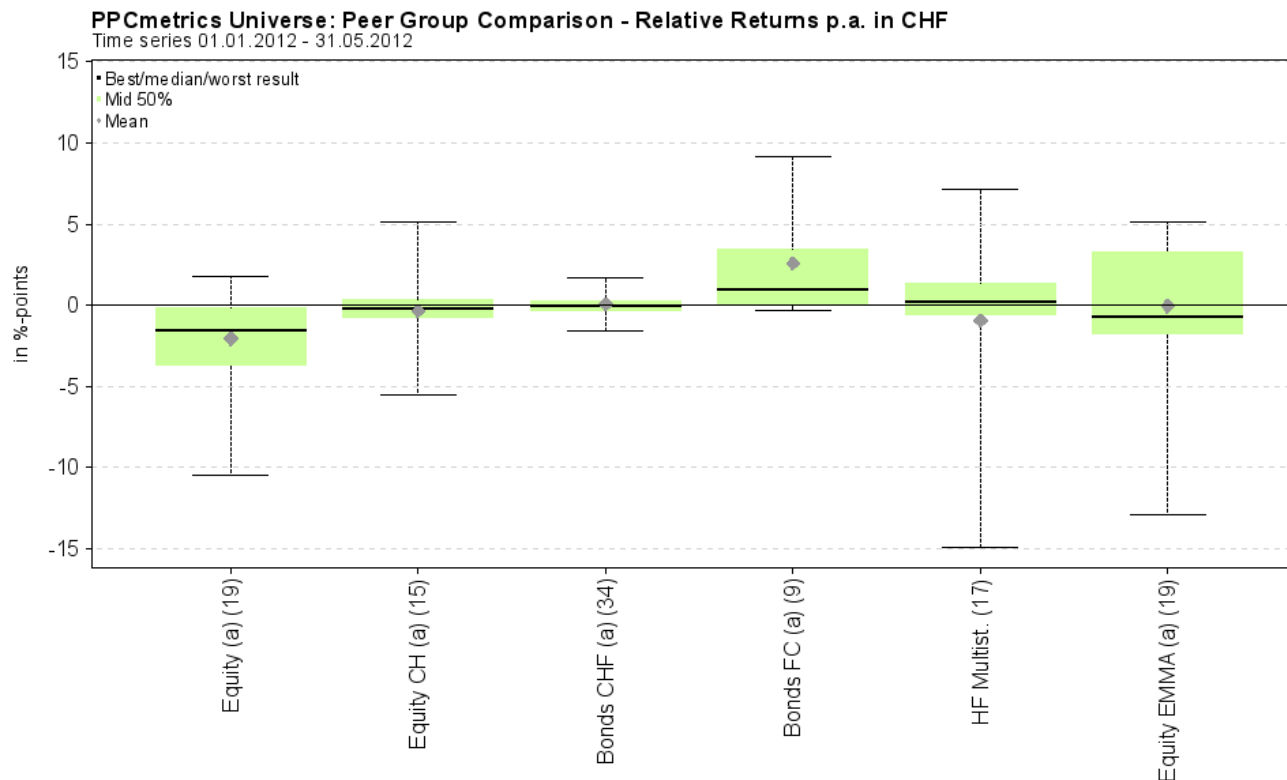


- The graph shows **the relative returns** (differences to the respective benchmark) of real active and passive balanced portfolios:
  - Active portfolios with active tactical asset allocation (N=56)
  - Passive portfolios without active tactical asset allocation (N=29)
  - Time period: 3 years
  - Source: PPCmetrics investment controlling database

- According to our experience there are balanced portfolios with active tactical asset allocation where value was added. However, on average, balanced portfolios with active tactical asset allocation did **not** perform better than indexed portfolios without active tactical asset allocation.

## Strategy Implementation (2)

### Stock Selection



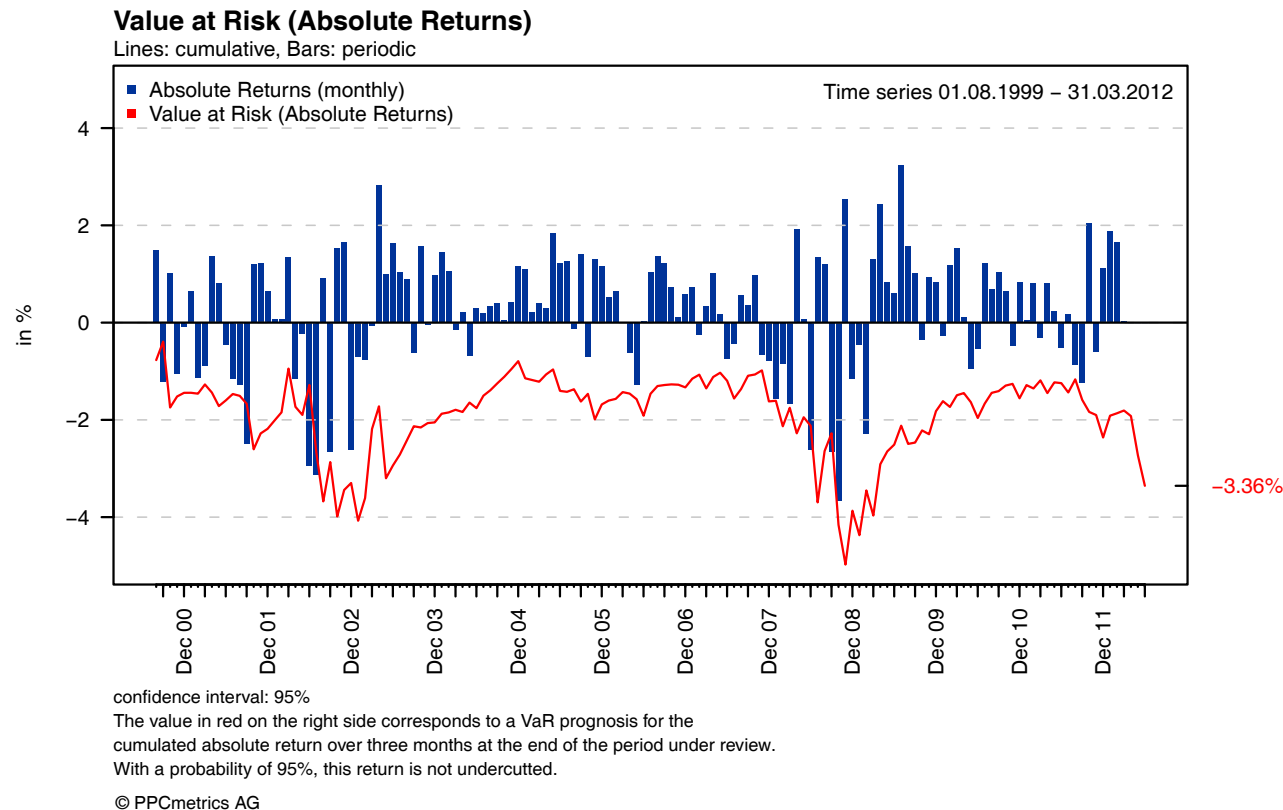
© PPCmetrics AG

- The average return (after deducting the costs) of actively managed mandates are **lower** than the return of the benchmark. This finding is consistent with other empirical observations.

# Investment process (1)

## VaR Strategy risk (I)

- Value at Risk (VaR)\* **Strategy risk**

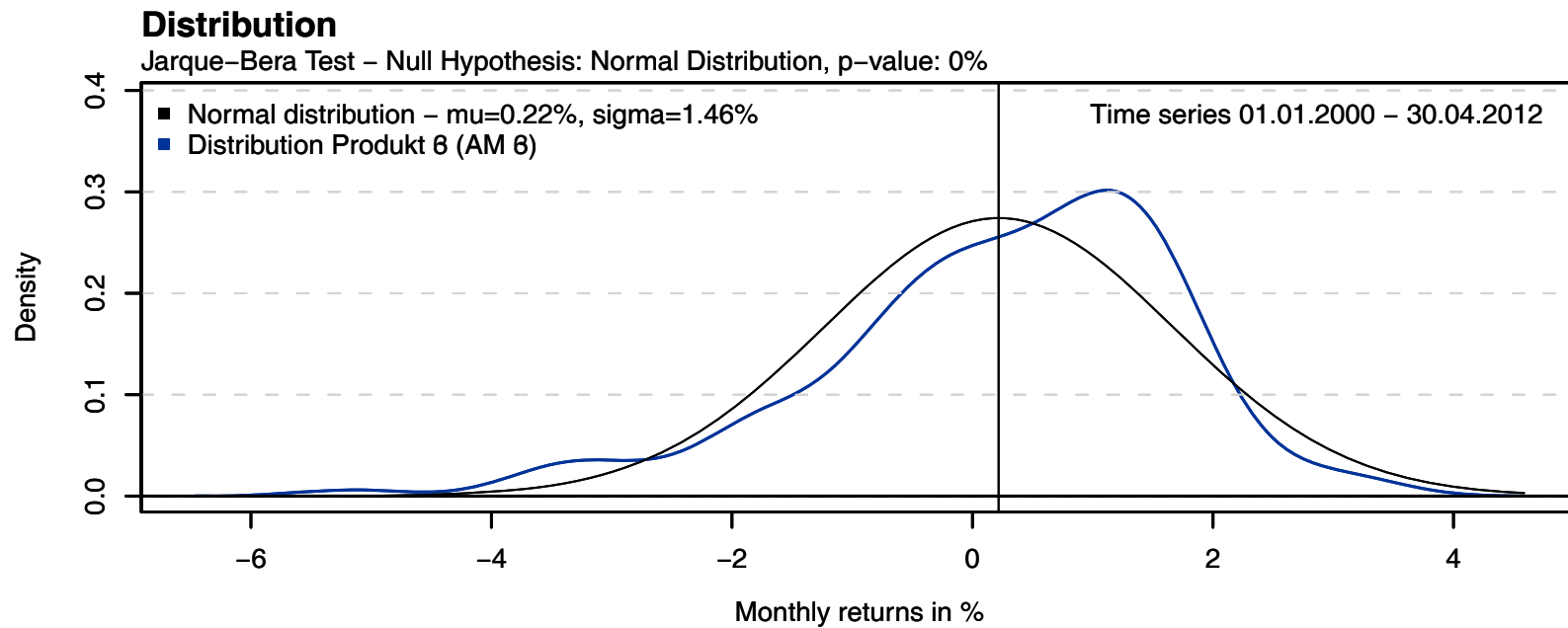


- The VaR Forecasting is based on a **AR(1)-GARCH(1,1)** model

## Investment process (2)

### VaR Strategy risk (II)

- VaR Strategy risk

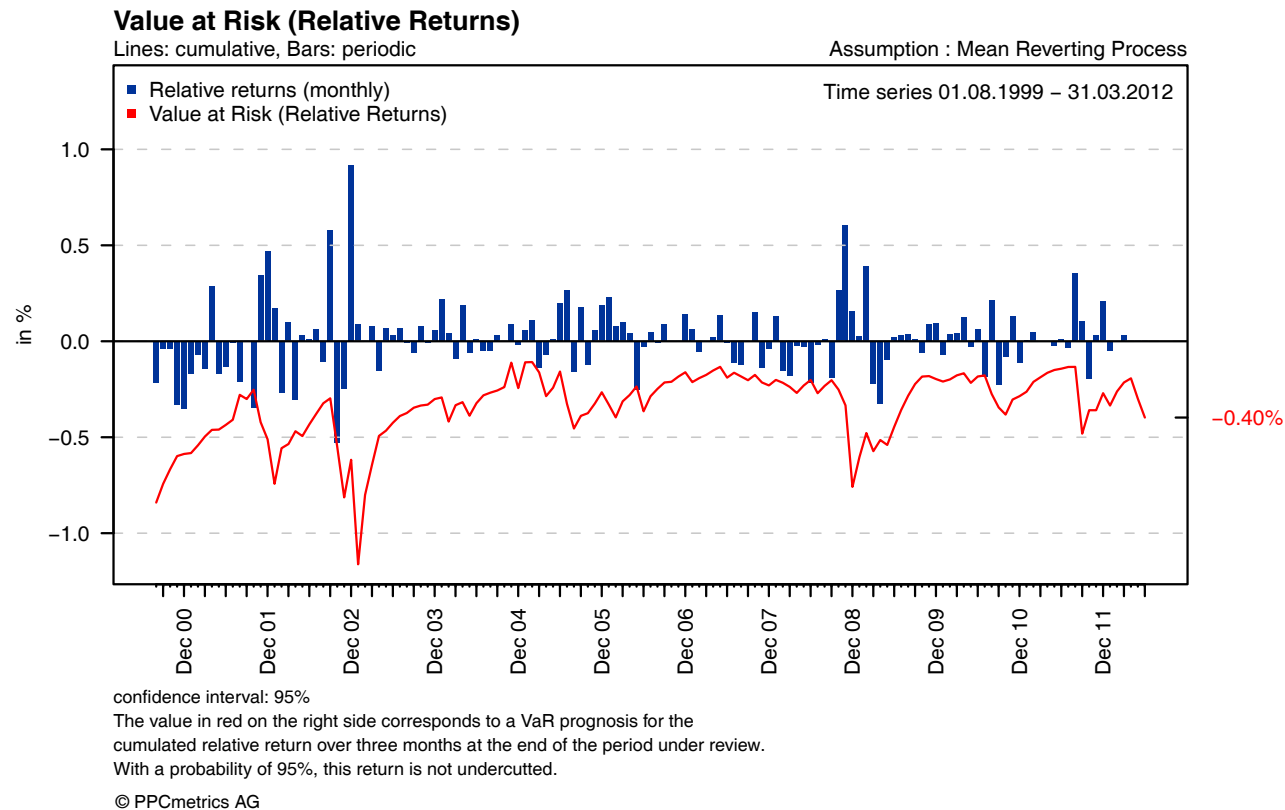


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## Investment process (3)

### VaR Implementation risk (I)

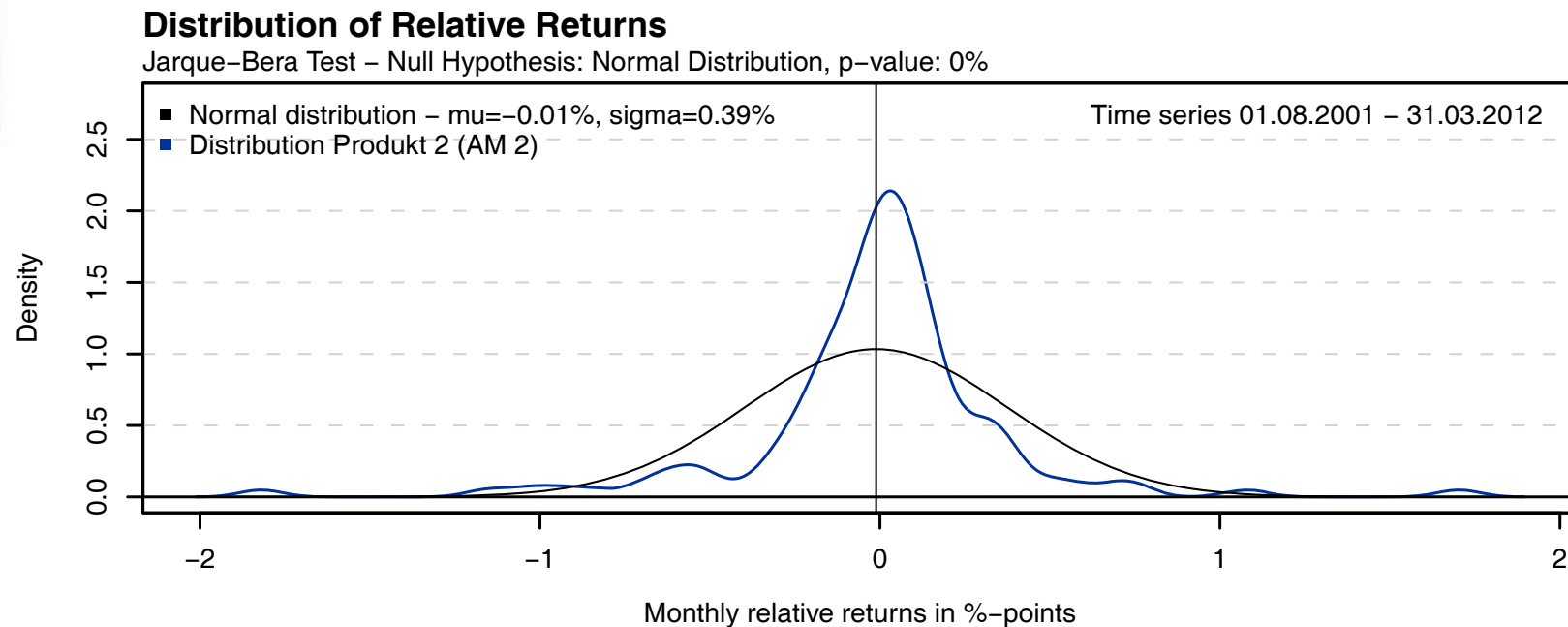
- VaR implementation risk



## Investment process (4)

### VaR Implementation risk (II)

- VaR implementation risk



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## Investment process (5)

### Conclusions VaR

- The VaR analysis stress the importance of the **strategy** with respect to the **implementation**
  - The VaR relative to the **strategy** (absolute returns) shows that this decision could imply a **loss** (in the next 3 months) of about **-3.36%**
    - Best month performance: about +3.8%
    - Worst month performance: about -5.5%
  - The VaR relative to the **implementation** (relative returns) shows that this decision could imply a **loss** (in the next 3 months) of about “only” **-0.40%**
    - Best month relative return: about +1.8%
    - Worst month relative return: about -1.9%



## Investment process (6)

### Conclusions

- 3 layers of the investment process:
  - Investment strategy
  - Tactical asset allocation/rebalancing mechanism
  - Portfolio management/stock selection
- From an empirical point of view, the **investment strategy is extremely important**. It is necessary to determine the strategy in an active way.
- Active portfolio management (tactical asset allocation and stock selection) is a «*zero sum game*» in the long term.

# Summary

## Summary (1)

- At first, **know your liabilities through best economic estimate**
  - Economic funding ratio and future developments of the population's structure
- **Adapt** your promise to the market environment or define a risk budget and find a sponsor
- **Diversification** is the only “*free lunch*”
- Build **reserves**
- Strategy based on ALM methods and not on “*Asset only*” method

## Summary (2)

- 3 layers of the investment process can be distinguished:
  - The **investment strategy** is the most important factor regarding the risk/return profile of a pension fund → **ALM**.
  - **Portfolio management** (tactical asset allocation and stock selection) is responsible for most of the costs in the investment process, but given the fierce competition, adding value is very difficult.
  - **Active vs. passive management:** trade off between active implementation risk and opportunities of an outperformance. Empirical evidence suggests to go passive.

**Thank you for  
your attention!**

Any questions?

## Contact

### ppc metrics

Financial Consulting, Controlling & Research

#### PPCmetrics AG

Badenerstrasse 6

Postfach

CH-8021 Zürich

Telefon +41 44 204 31 11

Telefax +41 44 204 31 10

E-Mail [ppcmetrics@ppcmetrics.ch](mailto:ppcmetrics@ppcmetrics.ch)

[www.ppcmmetrics.ch](http://www.ppcmmetrics.ch)

#### PPCmetrics SA

23, route de St-Cergue

CH-1260 Nyon

Téléphone +41 22 704 03 11

Fax +41 22 704 03 10

E-mail [nyon@ppcmetrics.ch](mailto:nyon@ppcmetrics.ch)

[www.ppcmmetrics.ch](http://www.ppcmmetrics.ch)

PPCmetrics SA (Zurich and Nyon) is an independent Swiss leading company in investment consulting for Institutional Investors and pension funds.

PPCmetrics is specialized in ALM studies, Asset Manager Selection as well as Controlling and Consulting.



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