# The steeping of health expenditure profiles

Dr. Florian Buchner, Munich Re

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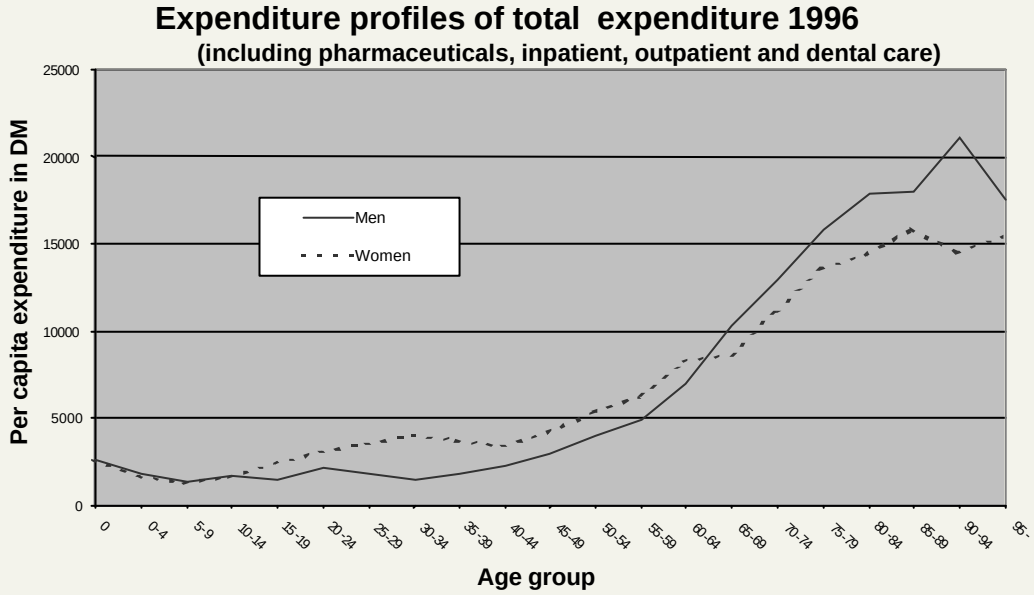
# Introduction

**Health care expenditure per capita for elderly people are a lot higher than per capita expenditures for younger people. We call this correlation of average per capita expenditure and age "expenditure profiles":**



# Introduction

**Research Question:**

**Does per capita health expenditure of the elderly grow faster than per capita health expenditure of young people?**

**Steeping-Hypothesis:**

**Health care expenditure for the elderly grows faster than for younger people, so the expenditure profiles become “steeper”, we created the term “steeping” for this phenomenon**

**Consequences:**

**Steeping has high impact on future health care costs, prognosis has to include this trend**

# Data and study design

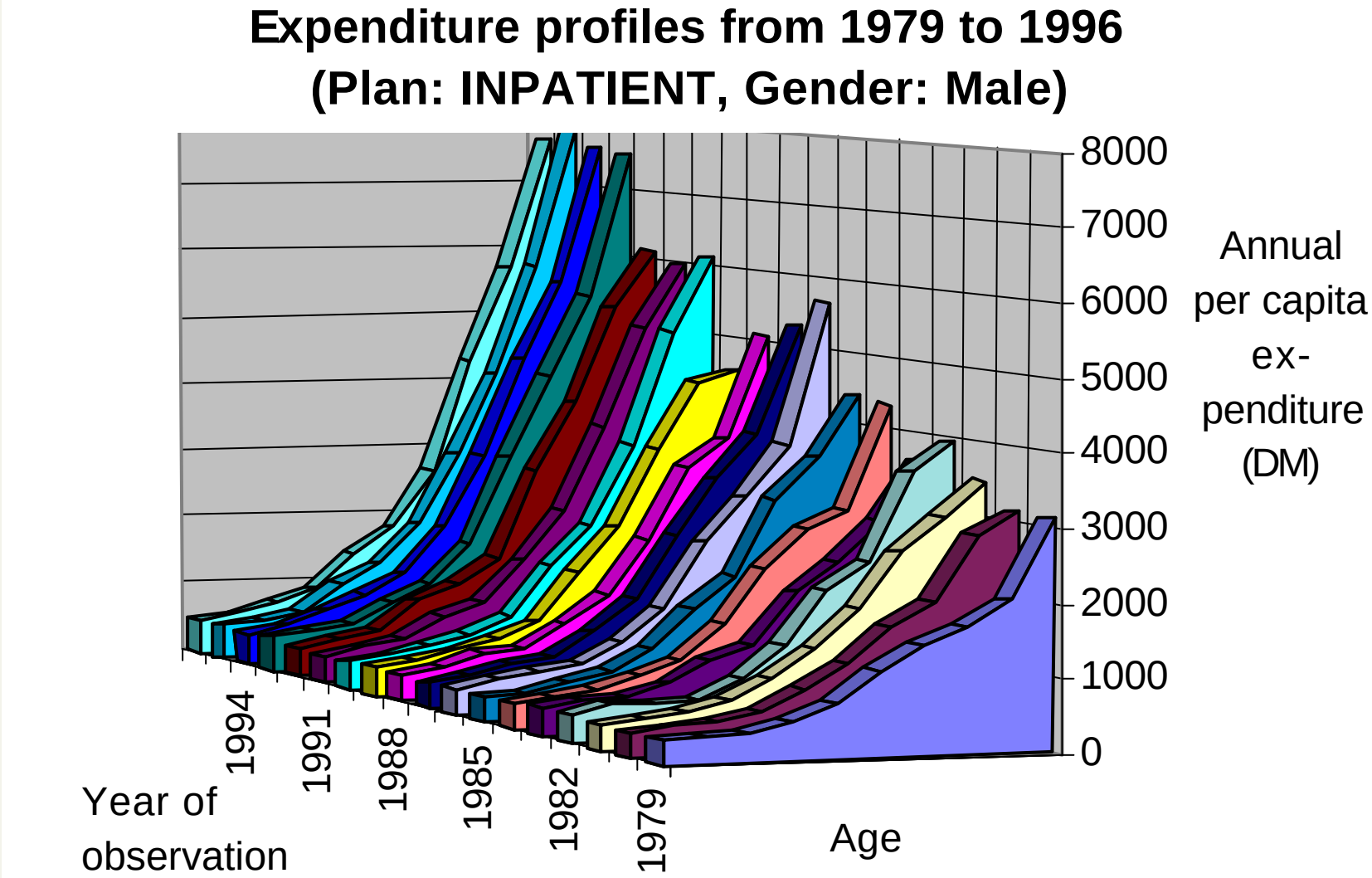
**Claims data of the largest German private health insurer DKV**

- **covering a period of 18 years 1979-1996**
- **Various insurance plans for inpatient, outpatient services, and supplementary insurance plans**
- **5-year age-groups from 30 – 79 years**

**Retrospective study design**

**Expenditure profiles built by a year-approach**

**In the charts of this presentation the data of the inpatient plan for men are used**


Expenditure profiles from 1979 to 1996
(Plan: INPATIENT, Gender: Male)
8000
7000
6000
5000
4000
3000
2000
1000
0
Annual per capita ex-penditure (DM)
1994
1991
1988
1985
1982
1979
Year of observation
Age

# Methods

**Three instruments for measuring the phenomenon of "steeping" were developed**

- **Age cut method**
- **Age group specific expenditure increase**
- **Exponential profile modelling**

**The results of the three methods are illustrated for the data of the inpatient plan for men.**

# Method 1: Age cut method

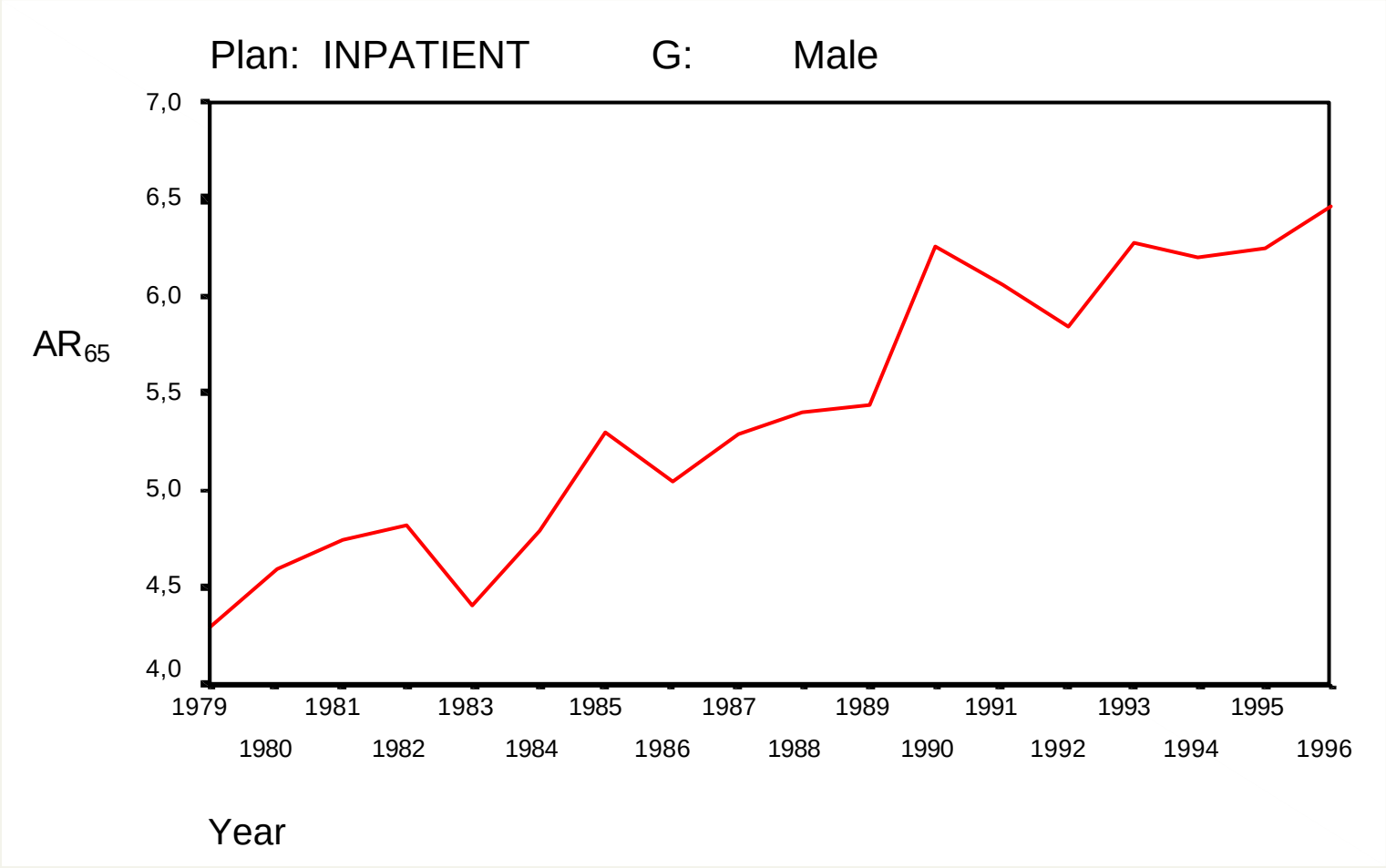
**Time trend of the simple relation between per capita expenditure of the old to the young (cut-point at the age of 65 years)**

$$AR_{65} = PCE_{65+} / PCE_{<65}$$

**AR** **Age-ratio**

**PCE** **Per capita expenditure**

# Results: Age cut method



# Method 2: Age group specific expenditure increase

**Comparison of the linear slope of per capita expenditure in the different age groups***

**For each age group**

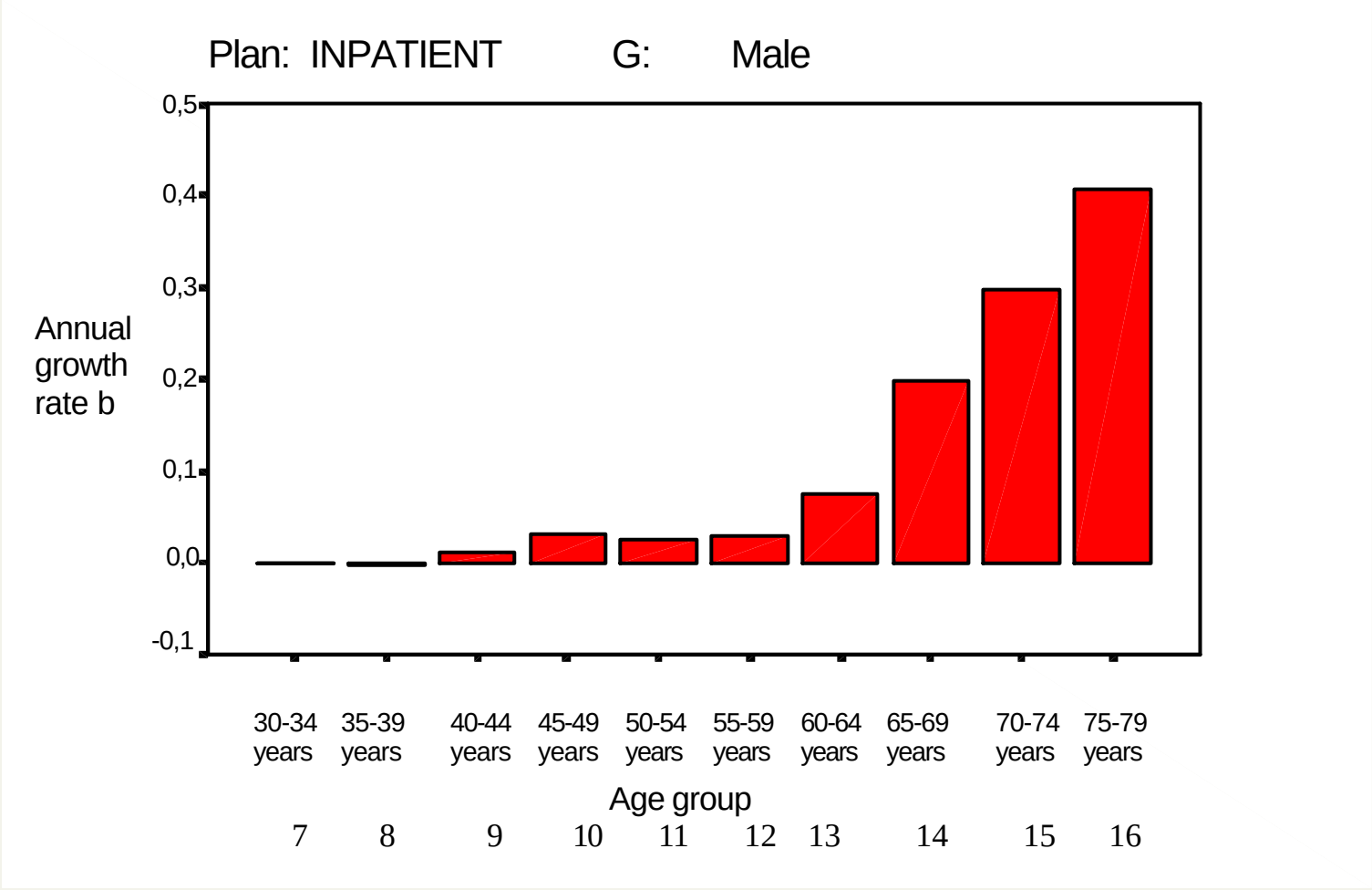
$$PCE^{Y} / PCE_{7}^{Y} = a + b * (Y - 1979)$$

**$PCE_Y$** **Per capita expenditure in Year Y**

**Y** **Year of observation**

* To exclude the influence of inflation on the results of these methods the expenditure profiles were standardised on the base of the youngest age group used (AG 7: 30-34 years)

# Results: Age group specific expenditure increase



# Method 3: Exponential profile modelling

**Time trend in parameters of nonlinear exponential modelling of expenditure profiles***

**For each year Y**

$$PCE_{AG}/PCE_{7} = a + \exp(b * AG)$$

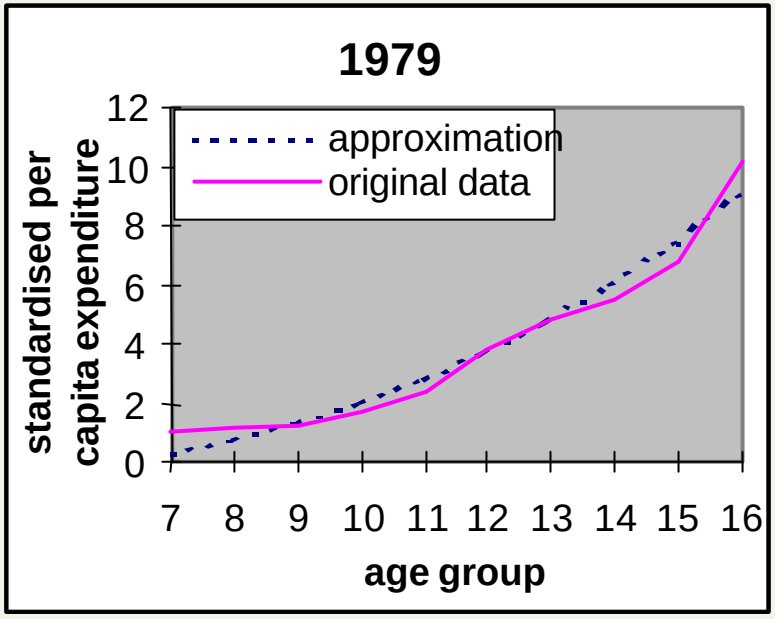
**PCE** **Per capita expenditure**

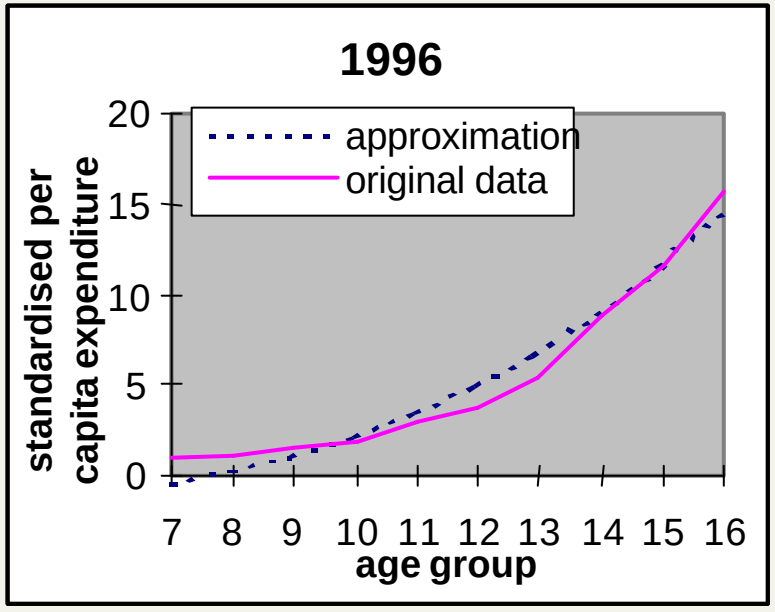
**AG** **Age-group (7 to 16)**

* For excluding the influence of inflation on the results of these methods the expenditure profiles were standardised on the base of the youngest age group used (AG 7: 30-34 years)

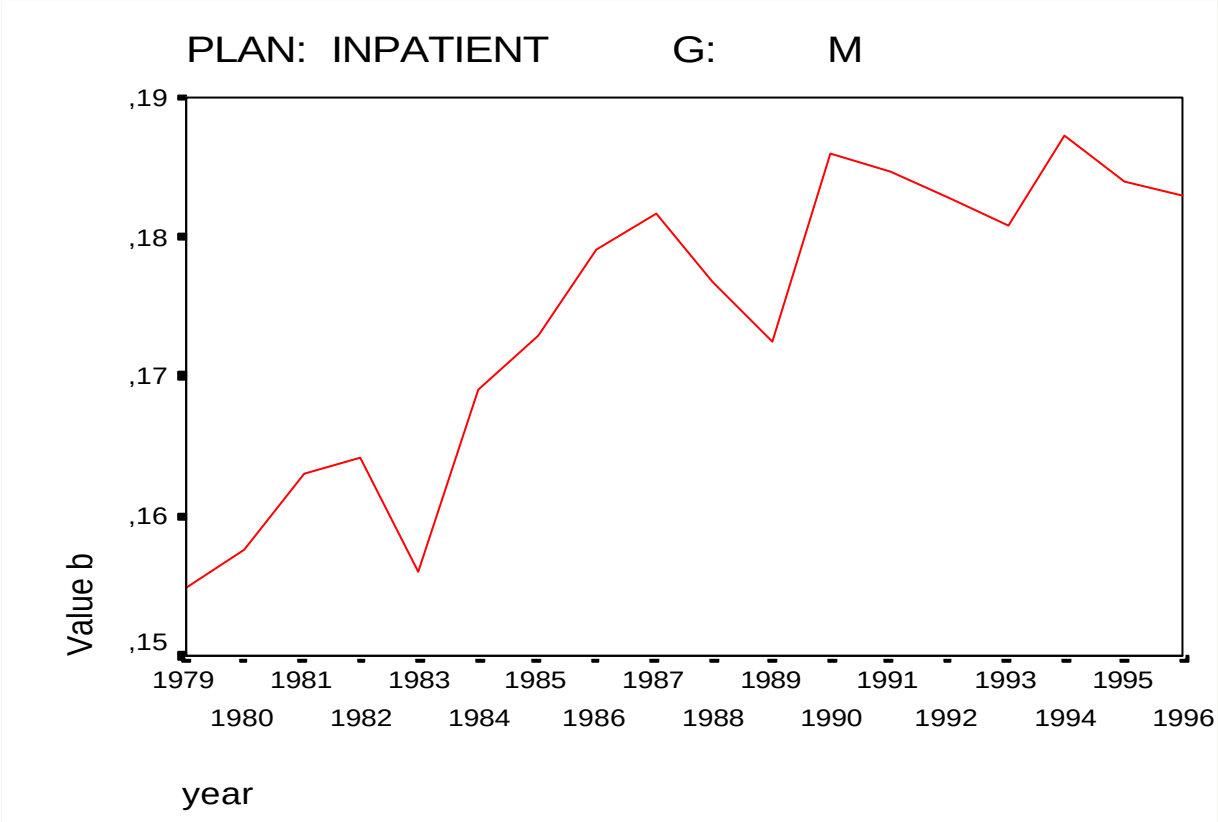
# Method 3: Exponential profile modelling

## Approximation of expenditure profiles (inpatient plan, men)



# Results: Exponential profile modelling



# Results

**General: Steeping in most of the examined plans in the period of observation with all three methods**

**Steeping can be observed in all types of health plans analysed**

- **for voluntarily insured**
- **for civil servants**
- **for the insured of the public system (supplementary health plans)**

## Additional results

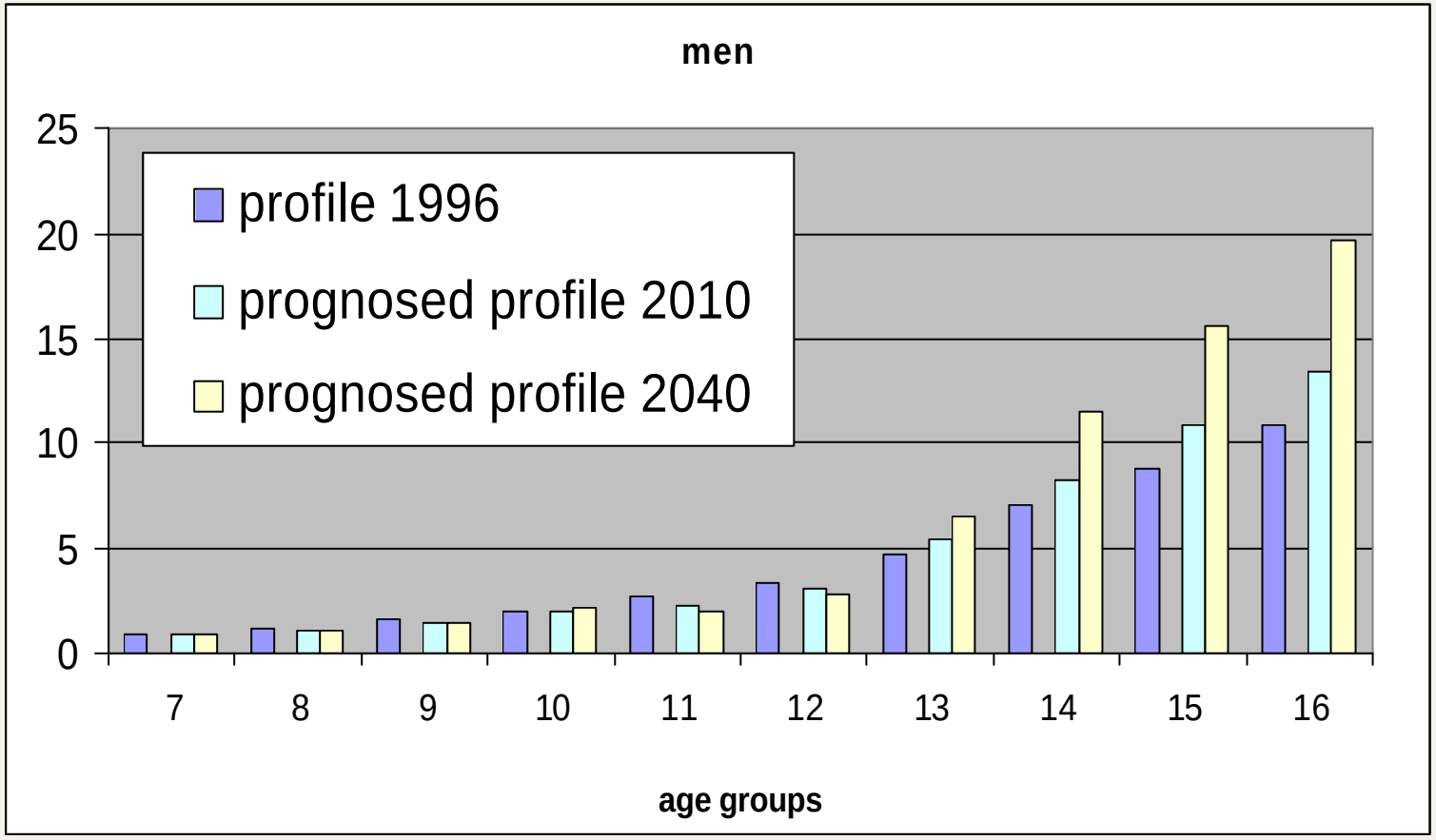
**Health plans of men seem to show stronger "steeping" than those of women, inpatient plans show stronger “steeping” than outpatient plans – but comparison of the steeping in different health plans is methodologically very difficult**

## Consequences

**What does this mean for future development of health care costs?**

# Prognosis

## Forecasted standardised profiles



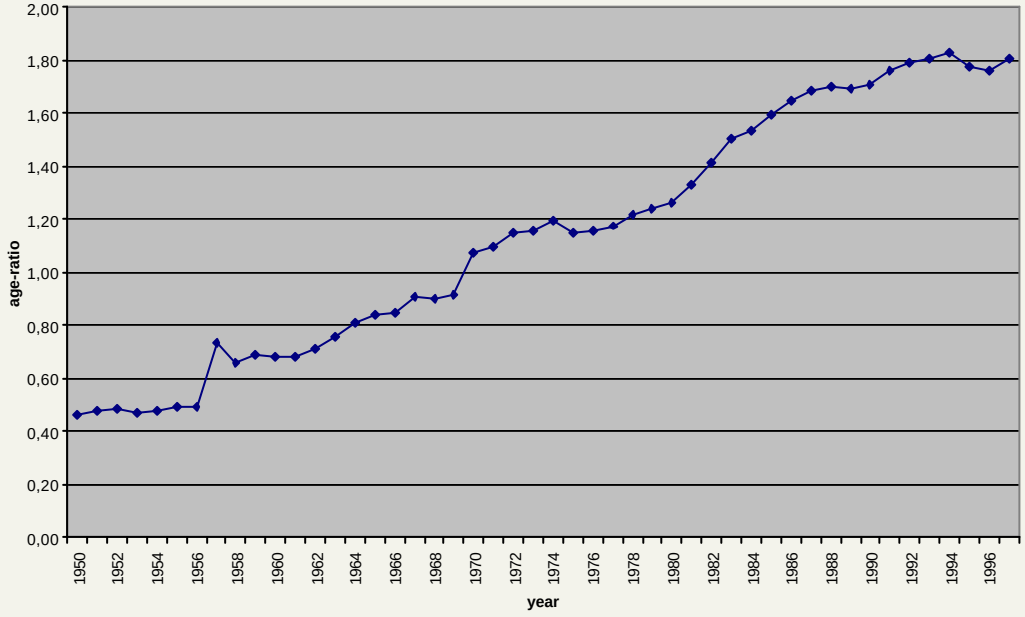
# Prognosis

| | increase in total expenditure in % | increase in per capita exp. in % | increase in contribution rate in % of income |
|---|---|---|---|
| **2010** | | | |
| whole effect | 30% | 31% | 2,9% |
| pure steeping effect | 15% | 15% | 2,0% |
| Pure demographic effect | 13% | 14% | 0,9% |
| | | | |
| **2040** | | | |
| whole effect | 92% | 128% | 12,9% |
| pure steeping effect | 57% | 57% | 7,6% |
| pure demographic effect | 23% | 46% | 3,4% |

# Discussion: Generalization of the results

**Applying the three described methods for data of the association of private health insurance results are similar to the results of DKV data presented**

**Similar trend of the “age-ratio” ("pensioners" to "non-pensioners") in the public health insurance system**



# Discussion: Reasons and consequences

**Because of the given structure of data, detailed research of causes of “steeping” is not possible.**

**Potential effects which may have caused steeping:**

- **Change in the patterns of morbidity**
- **Increasing share of elderly living in single-person households**
- **Financial effect of medical innovations stronger among the elderly**

**Paradox of steeping in a pay as you go system**

- **each generation will be winning**
- **contract of generations is undermined**

# Thank you for your attention!

Dr. Florian Buchner

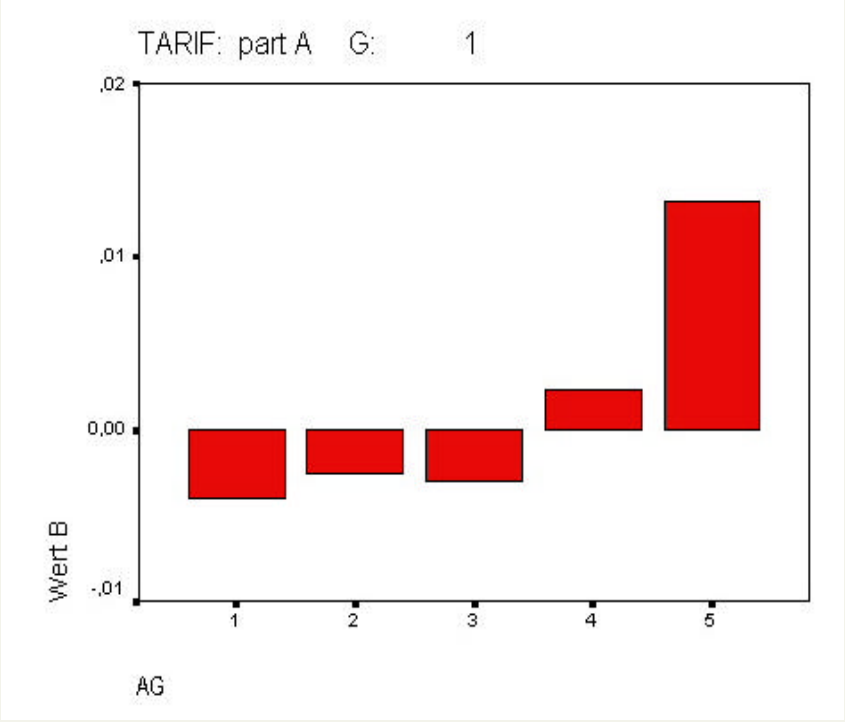
Münchener Rück
Munich Re Group

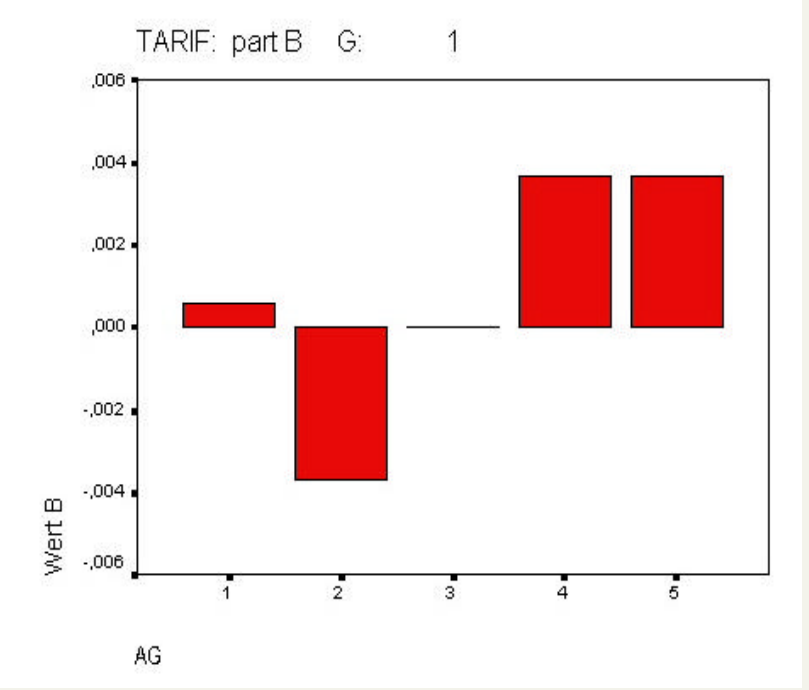
# Back up

# Sample size in the main health plans

| health plan | men | women | sum |
|---|---|---|---|
| OUTPATIENT1 | 31.561 | 15.097 | 46.658 |
| OUTPATIENT2 | 17.778 | 9.306 | 27.084 |
| INPATIENT | 131.251 | 56.582 | 187.833 |
| SUPPLEMENTARY | 265.496 | 364.044 | 629.540 |

# Steeping in HCFA-Medicare-data (without Medicaid)



# Division of expenditure profile for insured in last year of life and not in last year of life