



International Association for the  
Study of Insurance Economics

# Études et Dossiers

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Extract from

## Études et Dossiers No. 348

**5<sup>th</sup> Geneva Association Health & Ageing  
Conference**

**Long Term Care –  
Risk Profiles, Determinants and Financing**

6-7 November 2008  
London

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November 2008

**Working Paper Series of  
The Geneva Association**

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Layout & Distribution: Valéria Kozakova

# Population Ageing and Health Care Expenditure: Is Long Term Care Different?

Stefan Felder

## Ageing and Health Economics

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- The cost of health care
- Intergenerational effect in the financing of health care
  - Flat or decreasing payment profile
  - Increasing expenditure profile

Is long-term care different ?

## Outline of talk

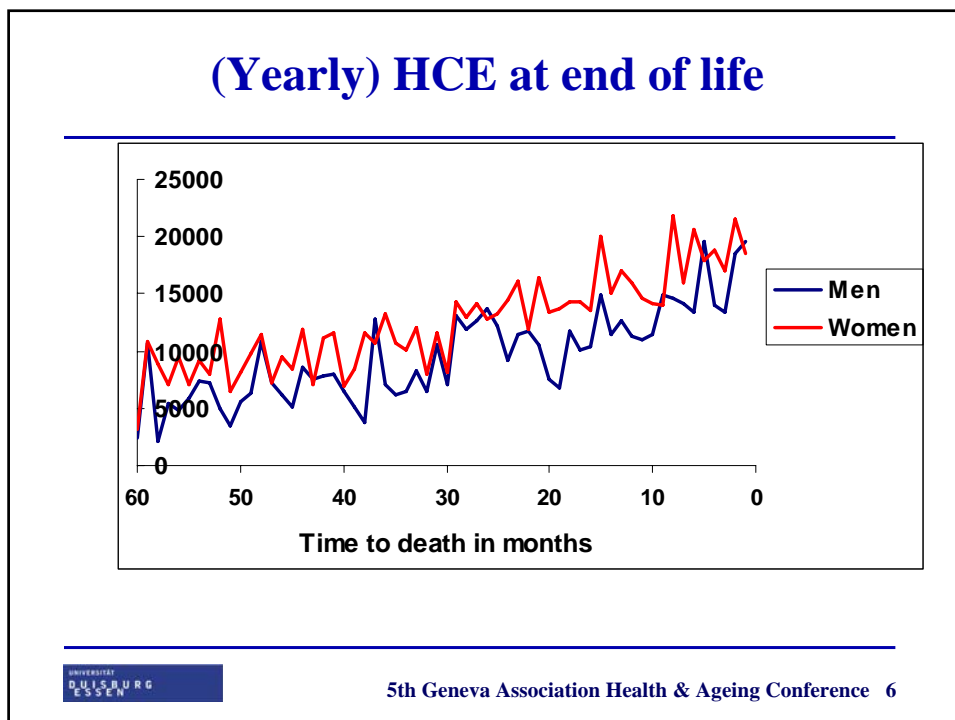
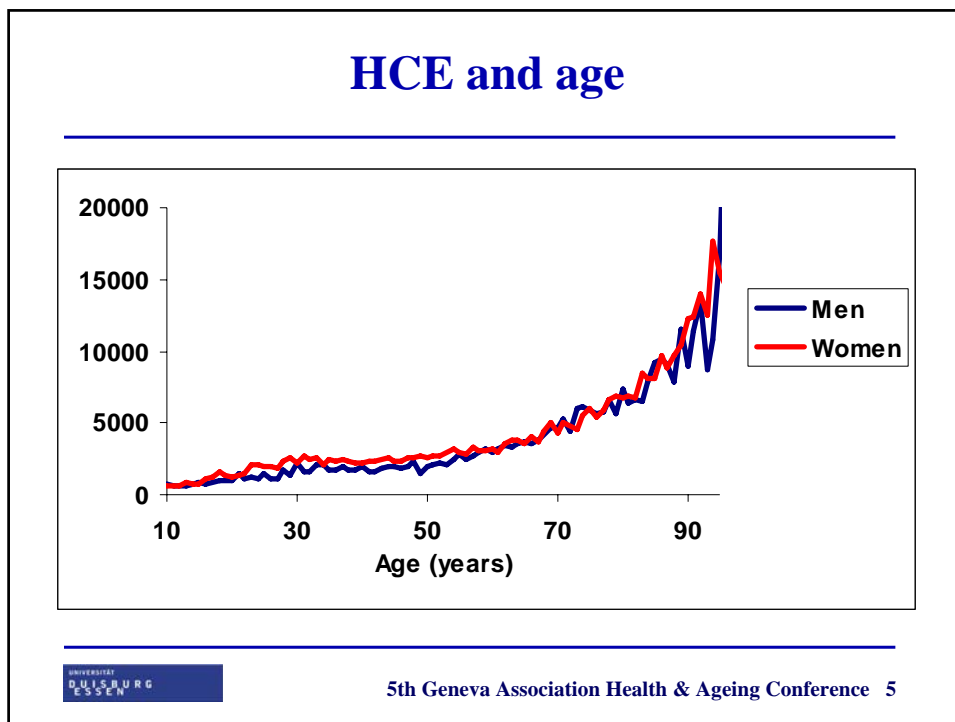
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1. Red herring
  - Is long-term care different?
  - Do long-term care patient differ?
2. Steepening of the health care expenditure age profile
  - Is long-term care different?
3. Conclusion

## 1. Red herring

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- Two stylized facts
  - Health care expenditures (HCE) increase with age
  - High HCE near end of life
  
- Following graphs are from Werblow, Felder and Zweifel  
(*Health Econ*, 2007)



## Implication

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- Red herring (Zweifel, Felder, and Meier, *Health Econ* 1999)
- Population ageing is *not* a crucial driver of HCE
- HCE depend primarily on time to death, not age *per se*

## Empirical research

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- Several other empirical studies
  - Felder, Meier, Schmitt (2000)
  - O’Neill et al. (2000)
  - Yang, Norton, Stearns (2003)
  - Seshamani and Gray (2004a, 2004b)
  - Zweifel, Felder, Werblow (2006)
  - Werblow, Felder, Zweifel (2007)
- General support of the red herring claim
  - Some find relatively small age effects

## Implication for future expenditure

- Projected HCE biased because they ignore changing mortality, end-of-life expenditures
- Current projections too high
  - Stearns and Norton (*Health Econ* 2004) by 9% to 15%
  - Breyer and Felder (*Health Policy* 2006) by 5% to 20%
- Good news for public health insurance

## Is long-term care different? Data /1

(Werblow, Felder, and Zweifel, *Health Econ* 2007)

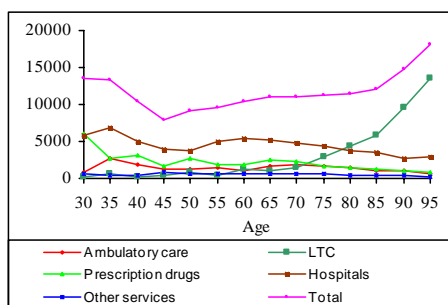
	Deceased 2000-2004		Survivors	
	Mean	SE	Mean	SE
N. of obs.	5,075		57,085	
<b>Total HCE (CHF)</b>	<b>11,567</b>	14,071	<b>2,795</b>	5,277
Age (years)	75.78	13.23	54.09	14.39
TTD in months	29	17	>60	0

## Components of HCE / Data / 1

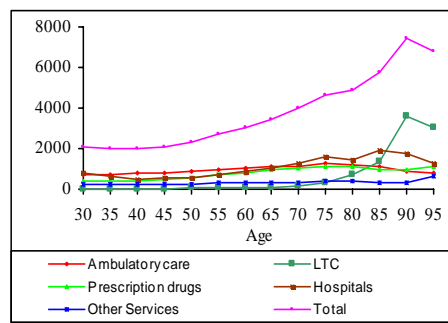
<i>Variable</i>	Deceased		Survivors	
	Mean	SE	Mean	SE
Ambulatory care (AC)	1,395	2,725	918	1,416
Hospital inpatient care (HIP)	3,261	8,316	544	2,911
Hospital outpatient care (HOP)	871	4,170	282	1,426
Prescription drugs (Drugs)	1,750	3,240	660	1,507
Other services (OS)	539	1,272	279	738
<b>Nursing home care (NHC)</b>	<b>3,291</b>	<b>8,034</b>	<b>90</b>	<b>1,326</b>
<b>Home care (HC)</b>	<b>460</b>	<b>2,299</b>	<b>24</b>	<b>427</b>

## Components of HCE / Data / 2

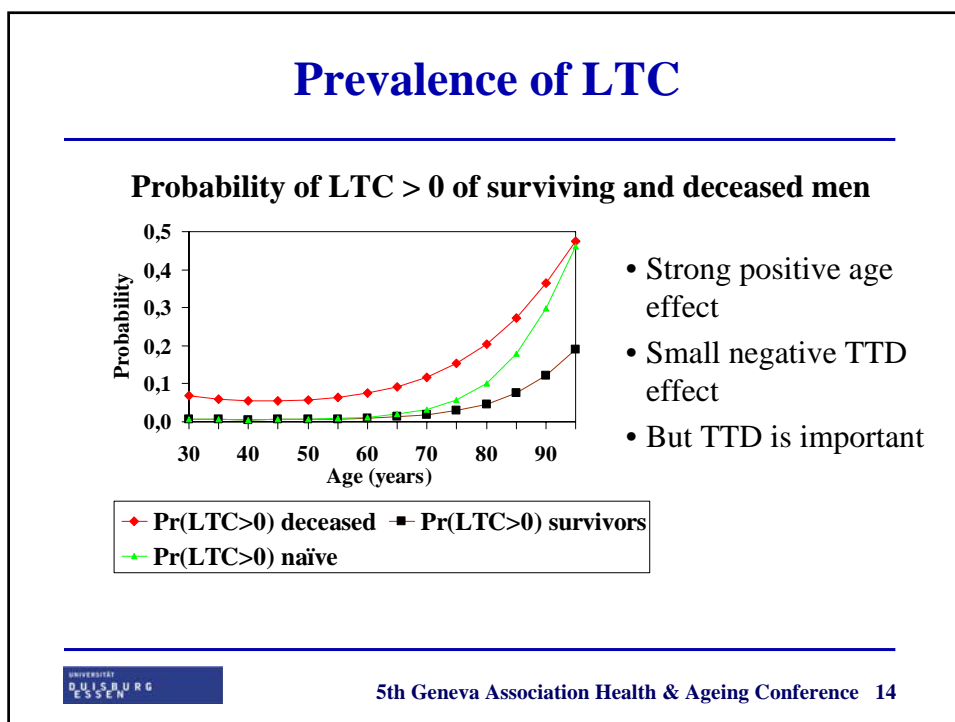
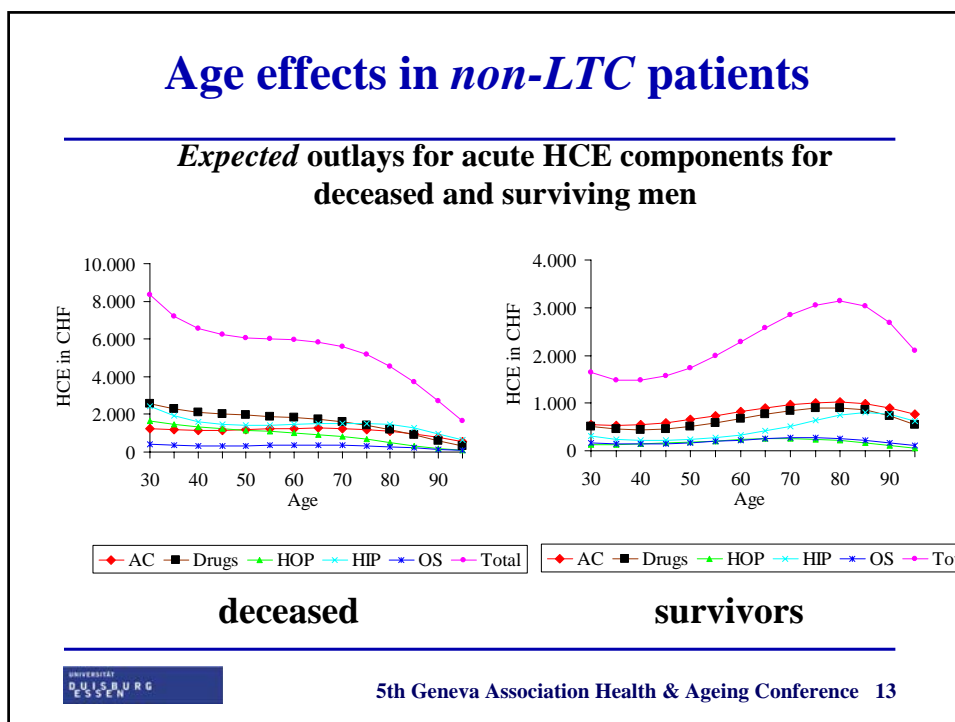
### Observed age profiles of HCE components

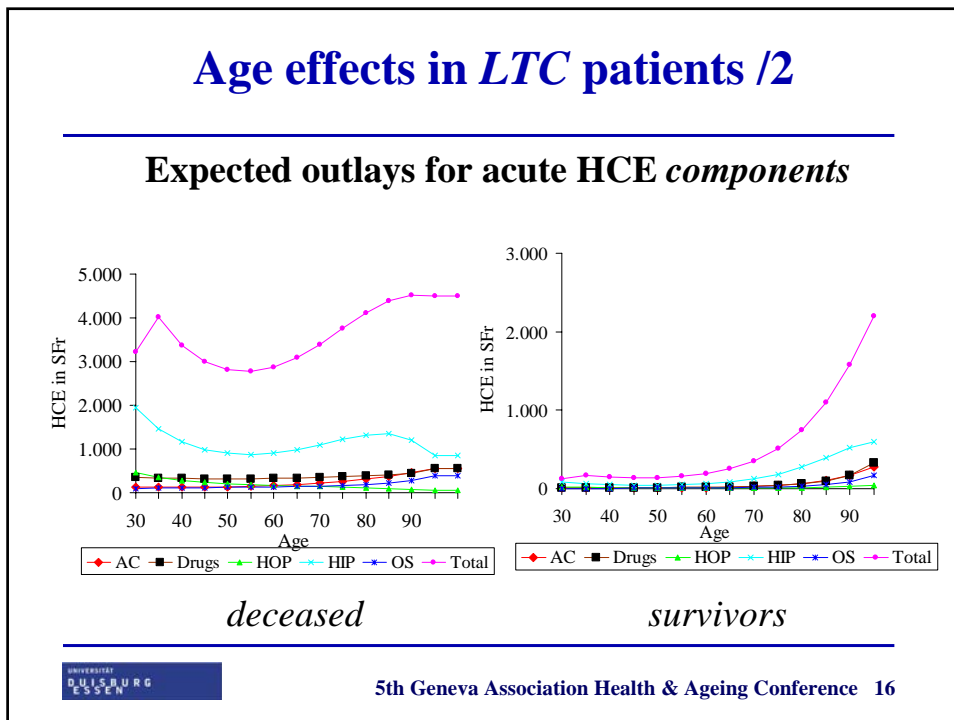
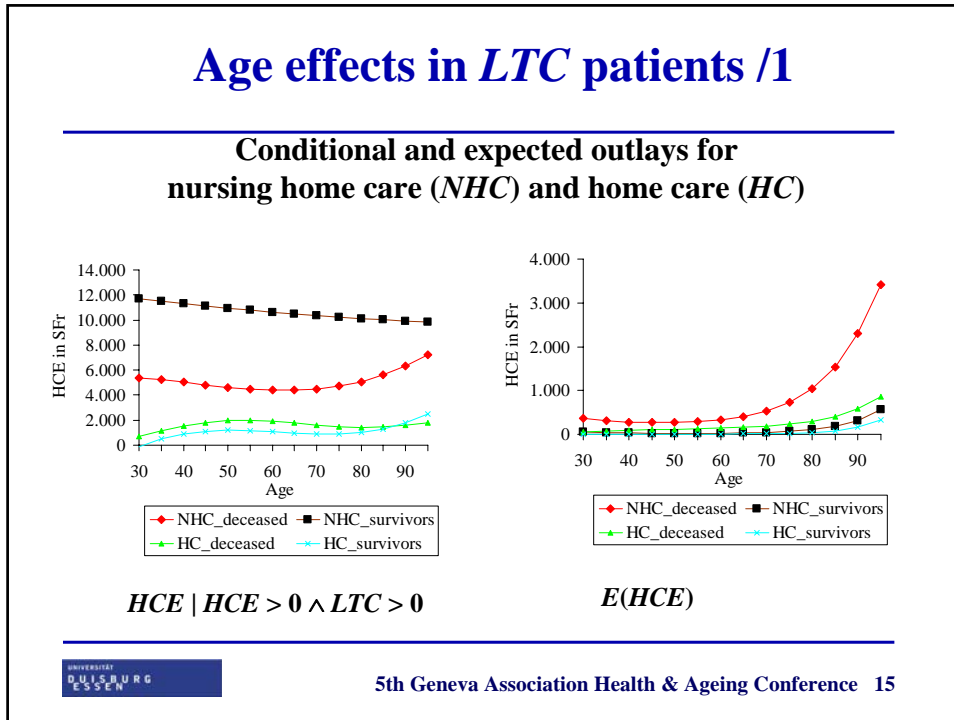


**deceased**



**survivors**



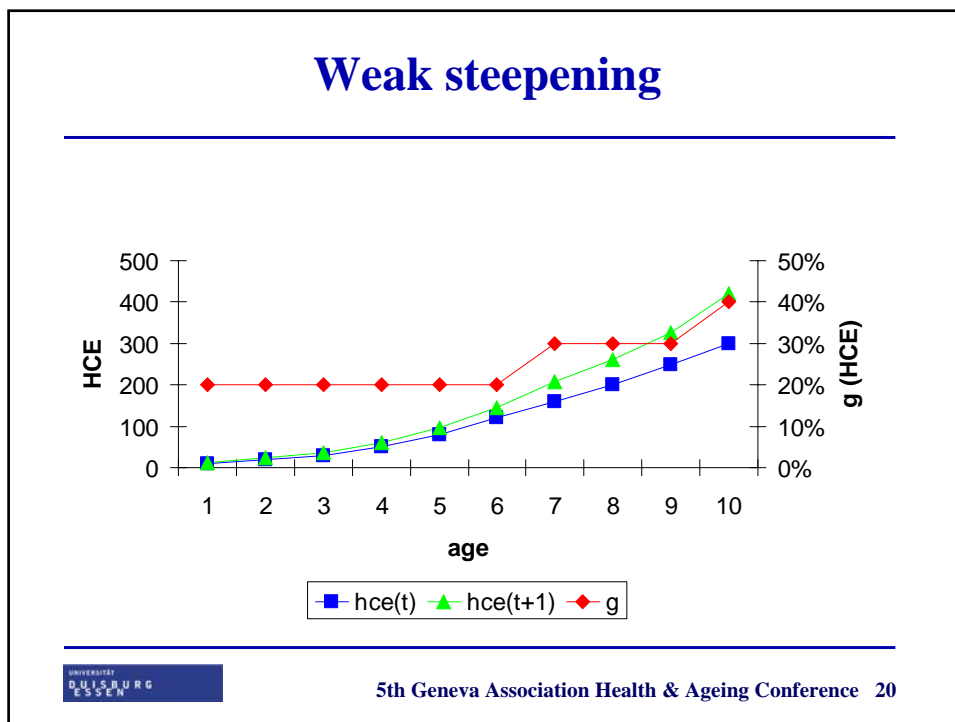
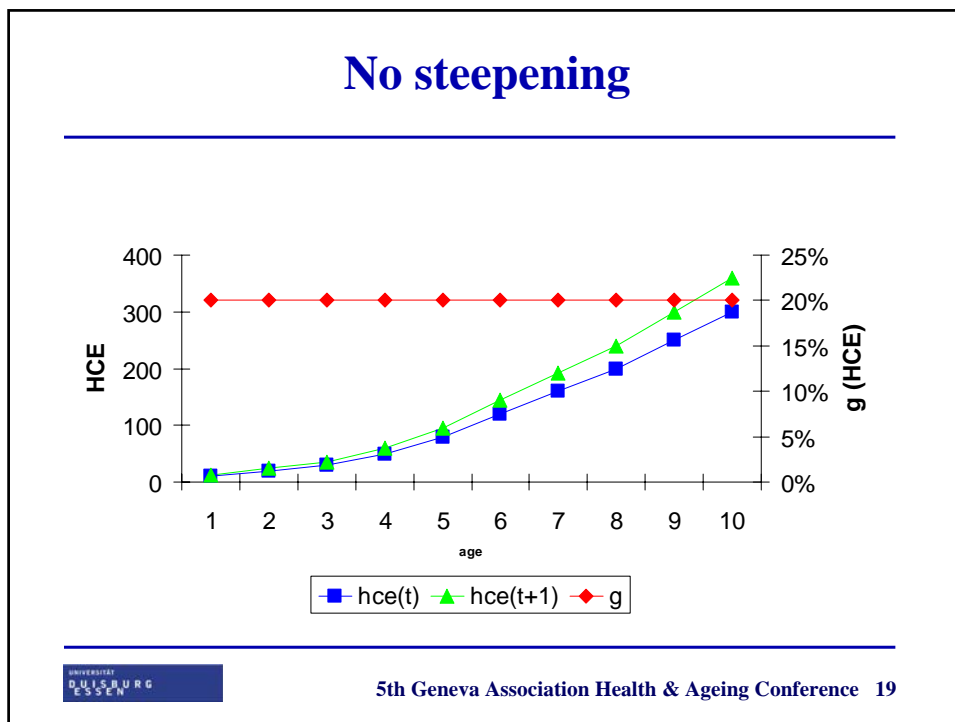


## Is long-term care different? /1

- Age profile for non-LTC patients:
  - Deceased: decreasing for all HCE components
  - Survivors: slightly increasing for ambulatory care, drugs and inpatient care
- Age profile for LTC patients
  - LTC increasing age profile
  - Acute HCE:
    - Deceased: small pos. effect for ambulatory care and drugs
    - Survivors: small pos. age effect for all components of acute HCE

## 2. Steepening of the age profile?

- *Buchner and Wasem (2006)* claimed steepening to be present, and concluded that
  - “future increase of health care costs will even be larger than in predictions that keep expenditure profiles constant”
- What influences age profile of HCE
  - expansion of the technological frontier in medicine is biased towards the treatment of old age diseases (+)
  - Compression of morbidity hypothesis (-)
  - The age profile of the end-of-life expenditure (-)



## Steepening: Data

- Age profile (20 five year age groups for women and men) of HCE and mortality rates for 25 Swiss cantons, years 1997-2006 (10,000 observations)
- Aggregate HCE in social health insurance and seven components of HCE

## The ratio of per capita HCE between the old and the young generation

Components	Ratio of 66+ to 0-65			Ratio of 51+ to 0-50		
	1997	2006	Rel. change	1997	2006	Rel. change
<b>AC</b>	2.03	2.29	12.93%	2.01	2.24	11.36%
<b>Drugs</b>	3.83	3.86	0.70%	4.33	4.35	0.41%
<b>HIP</b>	5.28	4.66	-11.71%	4.51	4.17	-7.51%
<b>HOP</b>	2.43	2.48	2.28%	2.43	2.61	7.46%
<b>HC</b>	31.02	28.79	-7.18%	28.79	31.75	10.29%
<b>NHC</b>	59.25	81.41	37.39%	54.38	111.41	104.89%
<b>Other</b>	2.41	2.20	-8.96%	2.29	2.16	-5.56%
<b>Aggregate</b>	3.85	4.00	3.93%	3.42	3.62	6.01%

## Identifying steepening of the HCE age profile

To address possible steepening, we render the growth rate to be dependent on age and assume that

$$\beta_a = \beta + \gamma_a \cdot a = \ln(1 + g + g_a)$$

growth path is influenced by other factors (e.g. mortality)

$$\ln h_{a,t} = \alpha_a + (\beta + \gamma_a \cdot a) \cdot t + \delta \cdot m_{a,t}$$

Steepening occurs if  $\frac{\partial^2 \ln h_{a,t}}{\partial a \cdot \partial t} = \gamma_a + \delta \cdot \frac{\partial^2 m_{a,t}}{\partial a \cdot \partial t} > 0$

## Econometric results

### Explaining ln (HCE) over time

Variable	Coefficient	SE	Coefficient	SE	
t	0.0323***	0.010			
<b>age · t</b>			<b>age · t</b>		
51-55 · t	-0.0045****	0.0015	76-80 · t	0.0168****	0.0019
56-60 · t	0.0091****	0.0017	81-85 · t	0.0069****	0.0021
61-65 · t	0.0023****	0.0021	86-90 · t	0.0121****	0.0022
66-70 · t	0.0148****	0.0023	91-95 · t	-0.0102****	0.0029
71-75 · t	0.0077****	0.0021	96+ · t	-0.0128****	0.0046
M	10.1661****	1.0694	m^3	51.7701****	6.4451
M^2	-36.4680****	3.9354	m^4	-24.2620****	3.6035
Number of observations	10,000		R^2	0,974	

## Econometric results

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- Weak steepening test:
    - Steepening occurs for most age groups
    - Expection the very old
  - no steepening in the strict sense
- ➔ No general pattern for steepening applies

## Is long-term care different? / 2

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### Steepening in components of health care expenditure?

- Effect of mortality on HCE
  - Strong in acute care
  - Minor in long-term care
- Steepening effects
  - Ambulatory care, drugs and hospital outpatient care: modest steepening
  - Hospital inpatient care: no steepening exists
  - Home care: no steepening (due to strong stochastics)
  - Nursing home care: no steepening in the strict sense
  - For all components: anti-steepening effects for the very old

## Is long-term care different? / 3

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### Population ageing and financing of health care

- Much stonger intergenerational distribution effects in LTC
- Pay-as-you-go-financed vs capital funded system

## Conclusion

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- Red Herring:
  - long-term care is different: positive age effects (mainly driven by increasing prevalence)
- Steepening of health care age profile
  - long-term care is different: mortality less important for profile.
  - some steepening for long-term care, albeit not in the strong version

## Further readings

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- *Geneva Papers on Risk and Insurance: Issues and Practice. Special Issue on Health Insurance, 2008: Does the age profile of health care expenditure really steepen over time? New evidence from Swiss cantons, (forthcoming).*
- *Health Economics, 2007: Population Ageing and Health Care Expenditure: A School of 'Red Herrings'?, 16, 1109-1127*
- Contact: stefan.felder@uni-due.de