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Zentrum für Europäische
Wirtschaftsforschung GmbH
Centre for European
Economic Research

Intangible Asset and its Contribution to Economic Growth – Further Evidence for Germany

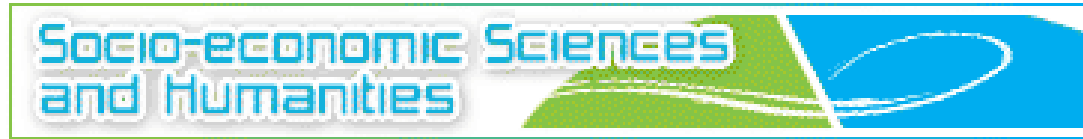
Dirk Crass, Georg Licht and Bettina Peters

ZEW Centre for European Economic Research, Mannheim, Germany

Stockholm Meeting, 28th and 29th September 2009

*Project funded by the European Commission
under the Seventh Framework Programme
Grant No 217512*

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Structure

- Intangible assets
- Measuring development costs in the financial industry
- Measuring firm-specific human capital
- Overview of alternativ German data sources
- Contribution of intangibles to economic growth
- Outlook



Intangible Assets (Corrado et al. 2006)

Computerized information

- Computer software
- Computerized databases

Innovative property

- R&D, including social sciences and humanities
- Mineral exploration
- Copyright and license costs (Creative Industries)
- New product development costs in the financial industry
- New architectural and engineering designs

Economic competencies

- Brand equity
 - Advertising expenditure
 - Market research
- Firm-specific human capital
 - Continuing vocational training
 - Apprentice training
- Organizational structure
 - Purchased
 - Own account



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Intangible Assets (Corrado et al. 2006)

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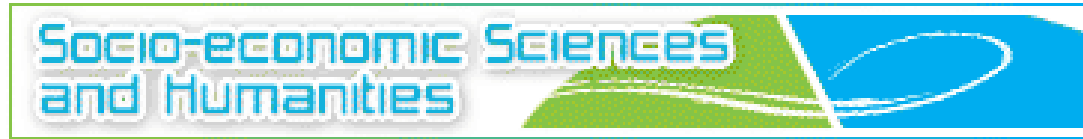
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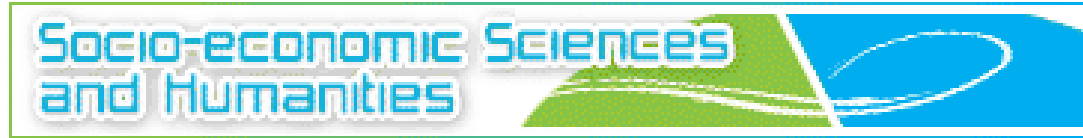
Measuring Development Costs in the Financial Industry



Measuring: Starting Point

New product development costs in the financial service industry...

- **Nakamura (2001)**
 - as a proportion of the non-interest expenses of banks and non-depository institutions.
 - He assumed 50% without giving a sound economic explanation.
- **Corrado et al. (2006)**
 - broadened the coverage to include other financial institutions
 - proposed to use as proxy a share of 20% of all intermediate purchases reported in the BEA's data on gross output and value added by industry.
 - this proportion was not backed up with a sensible argument.
- **Hao et al. (2008)**
 - defined investments as 20% of financial industry's intermediate costs.



Alternative European Data Source

Community Innovation Survey (CIS)

- Innovation= activities concerning the development and introduction of *product and process* innovations:
 - intramural R&D expenditure
 - extramural R&D expenditure,
 - acquisition of advanced machinery, facilities, software and external knowledge (e.g. patents, licenses, trademarks) to realize innovation
 - product design, construction, design of services and other preparations for the production/sale and distribution of innovations,
 - internal or external training specifically for innovation projects
 - launch of product innovations onto the market
- Examples for Financial Industry (Nace 65-67)
 - Telephone-/direct-banking around the clock
 - Adoption of individualized customer care in the securities business
 - Issuing of policies at the point of sale
 - Certified retirement-provision products
 - Ecological/ethical investments (earmarked for specific purposes)
 - Development of new financial derivatives



Alternative European Data Source

Community Innovation Survey (CIS)

■ *Advantages:*

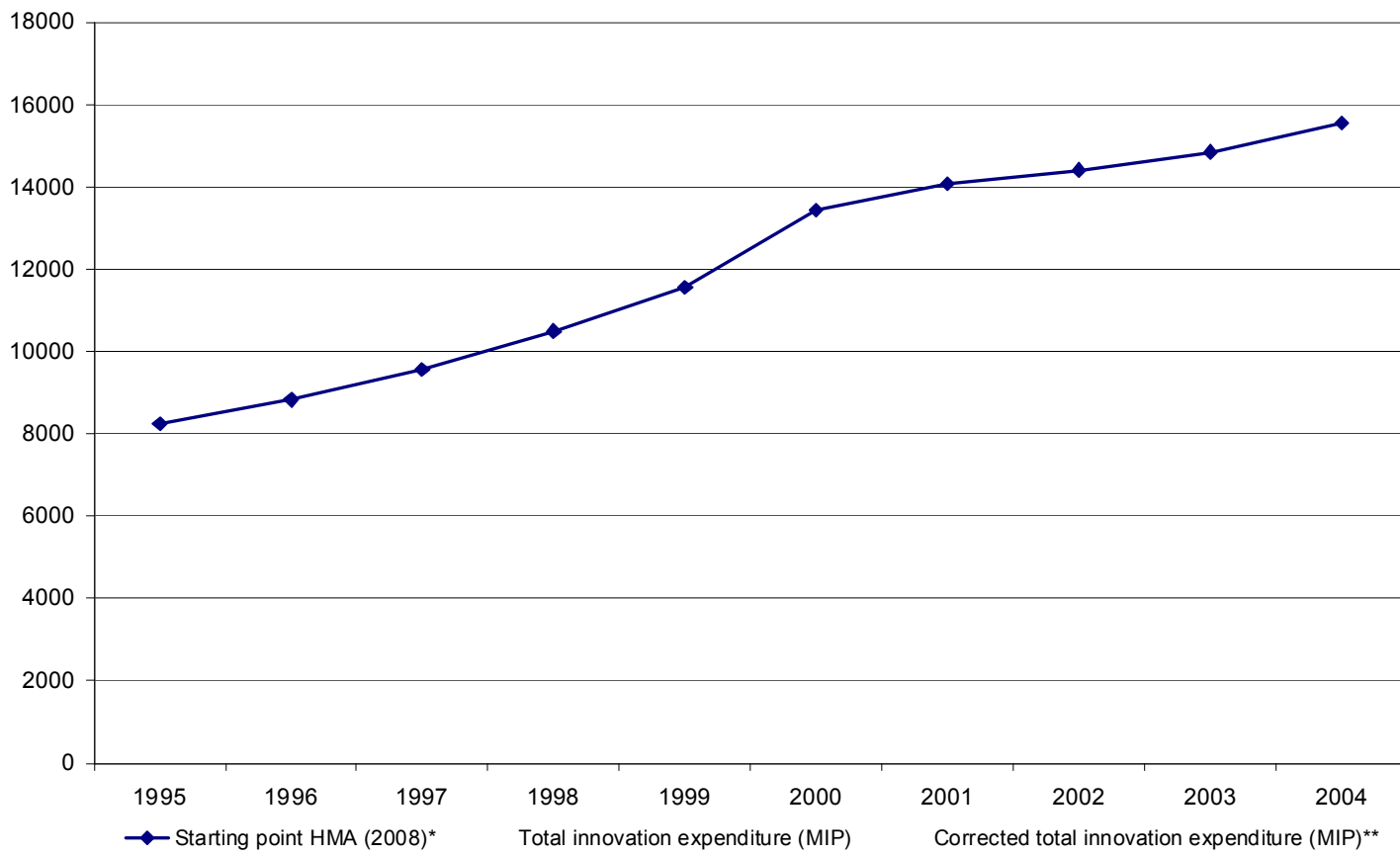
- Survey data on innovation expenditure in the financial industry
- Available for all European countries and many other OECD countries as well
- *CIS (Europe): 1996, 2000, 2004, 2006, 2008*
- CIS (Germany): annually since 1996

■ *Disadvantages:*

- No longer time series

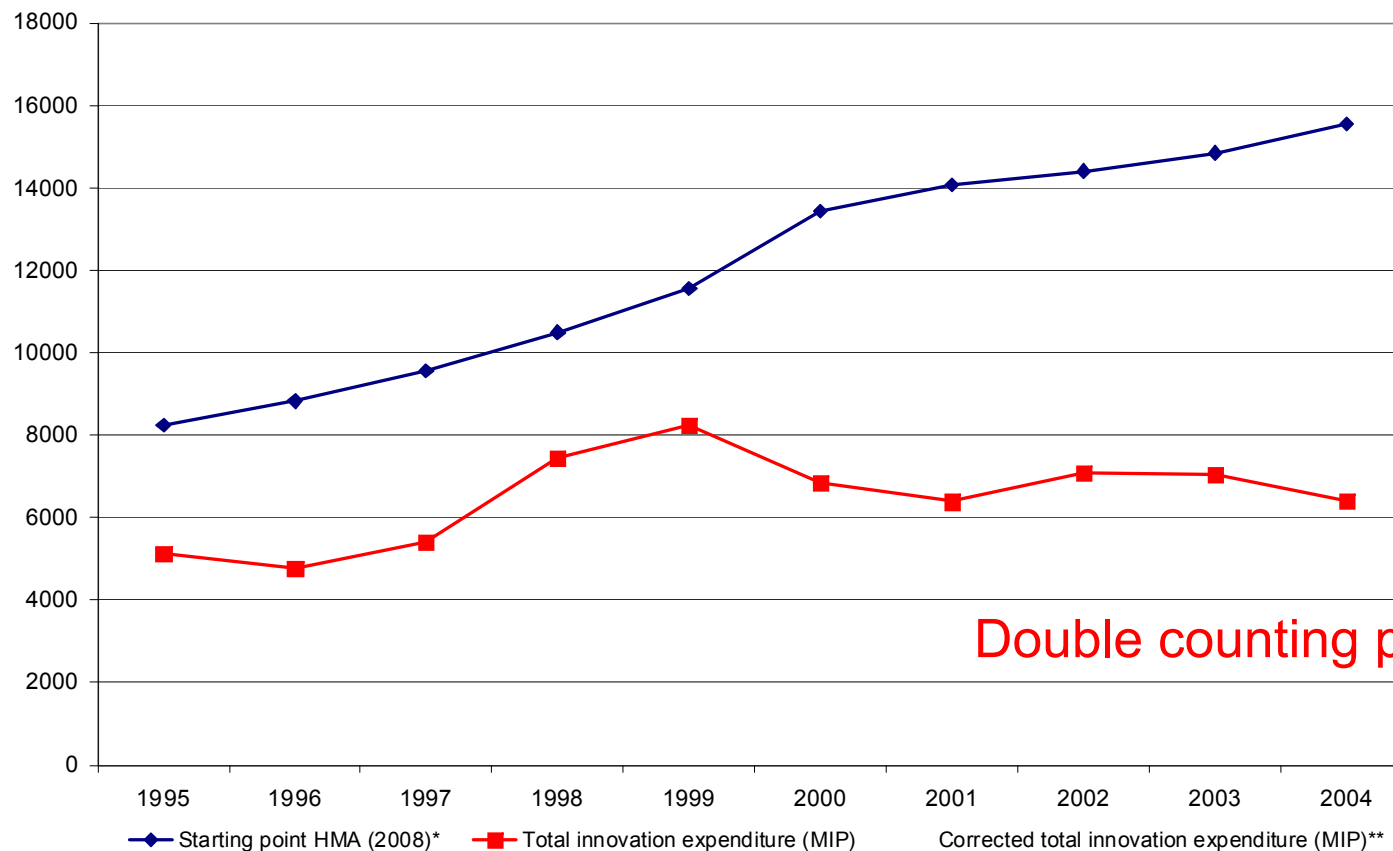


New product development costs in the financial industry (mn Euro)





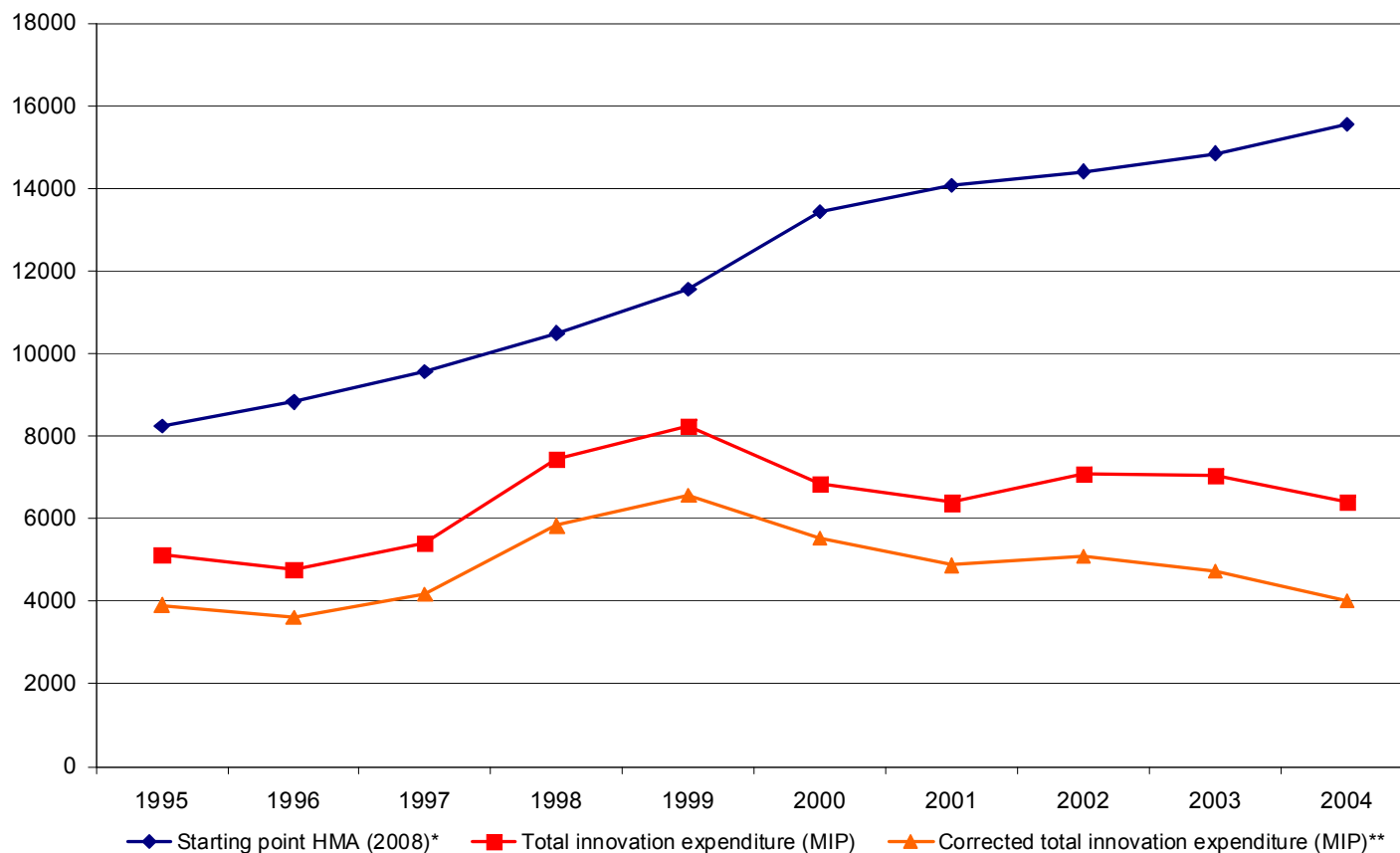
New product development costs in the financial industry (mn Euro)



Double counting problems?



New product development costs in the financial industry (mn Euro)



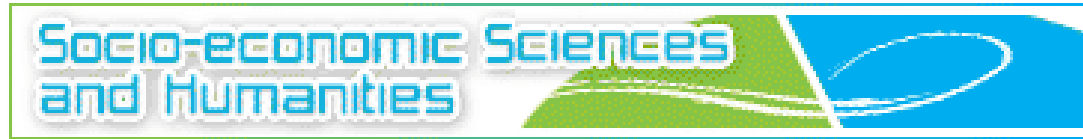


New product development costs in the financial industry (mn EUR)

<i>Year</i>	<i>Benchmark HMA (2008)*</i>	<i>Total innovation expenditure (MIP)</i>	<i>in % of HMA</i>	<i>Corrected total innovation expenditure**</i>	<i>in % of HMA</i>
1995	8239	5145	62	3910	47
1996	8833	4771	54	3626	41
1997	9563	5417	57	4185	44
1998	10502	7438	71	5838	56
1999	11568	8239	71	6569	57
2000	13446	6834	51	5534	41
2001	14082	6391	45	4880	35
2002	14413	7092	49	5087	35
2003	14855	7054	47	4733	32
2004	15544	6423	41	4012	26
2005	-	7300	-	-	-
2006	-	8060	-	-	-
2007	-	6483	-	-	-

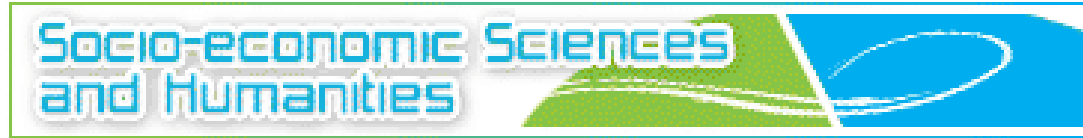
Source: HMA, ZEW

** Without investments in tangible assets for innovation projects



Measuring firm-specific human capital

- Continuing vocational training
- Apprentice training



Measuring: Starting Point

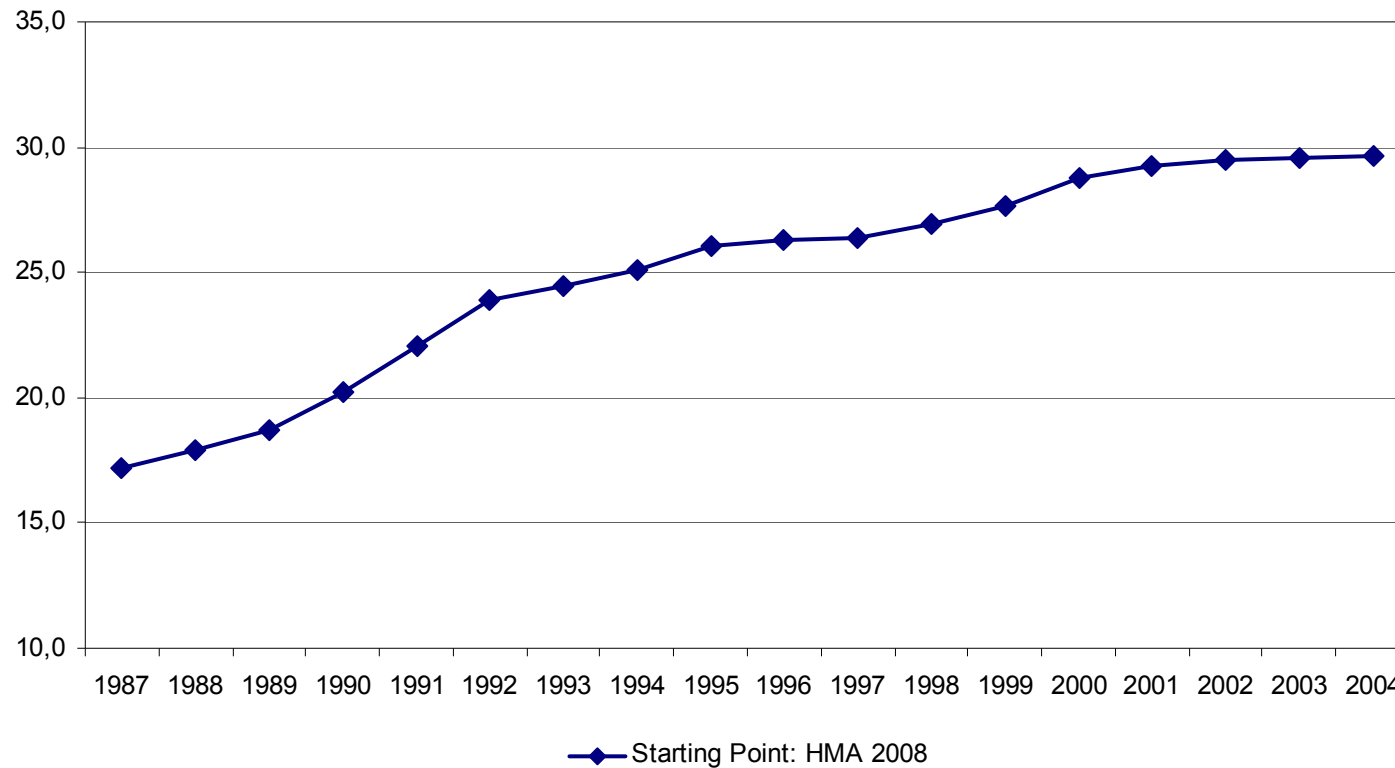
Firm-specific human capital

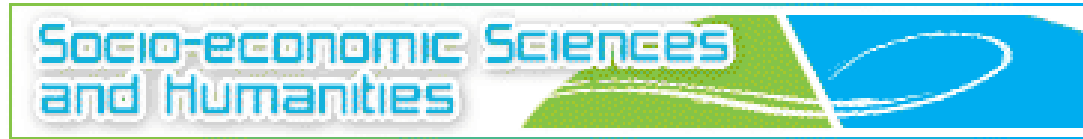
- **Hao et al. (2008)**
 - Comprises the costs of apprentice training and continuing vocational training.
 - Labor Cost Survey 2004 (EUROSTAT): costs of apprentice training,
 - Continuing Vocational Training Survey 2005 (EUROSTAT) provides the direct and indirect costs of continuing vocational training (as % of total labour costs), and EU KLEMS provides the total labor compensation.



Measuring: Starting Point

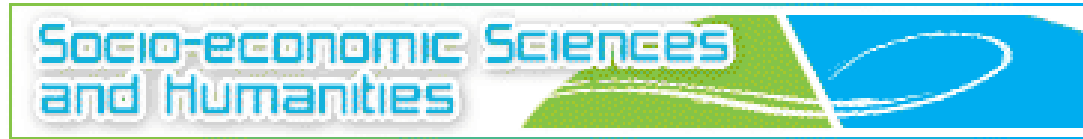
Firm-specific human capital





Measuring firm-specific human capital

- Continuing vocational training
- Apprentice training



Continuing vocational training

Alternative German data sources: Direct Costs

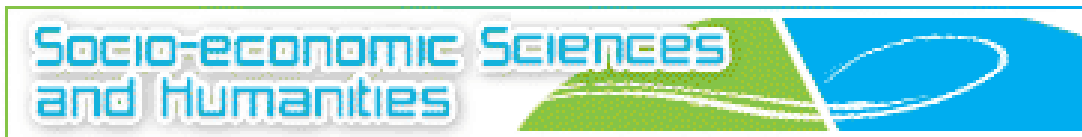
Federal Statistical Office: BLK-Bildungsbericht (report on education)

■ *Advantages:*

- Publicly available data
- Based on the CVTS and therefore comparable throughout Europe

■ *Disadvantages:*

- Only *direct* training costs
- Only companies with 10 employees or more are considered
- The CVTS is available for 1994, 2000, 2006.
- In the interim years, the data is projected forward (based on GDP deflator and development of employment)
- No consistent time series: 1994 not reliable, structural break in 2005
- No figures at the sector level available



Continuing vocational training

Alternative German data sources: Direct Costs

Mannheim Innovation Panel (MIP)

■ *Advantages:*

- Survey data
- annually since 1995
- Companies with 5 employees or more are considered
- Data at sector level available

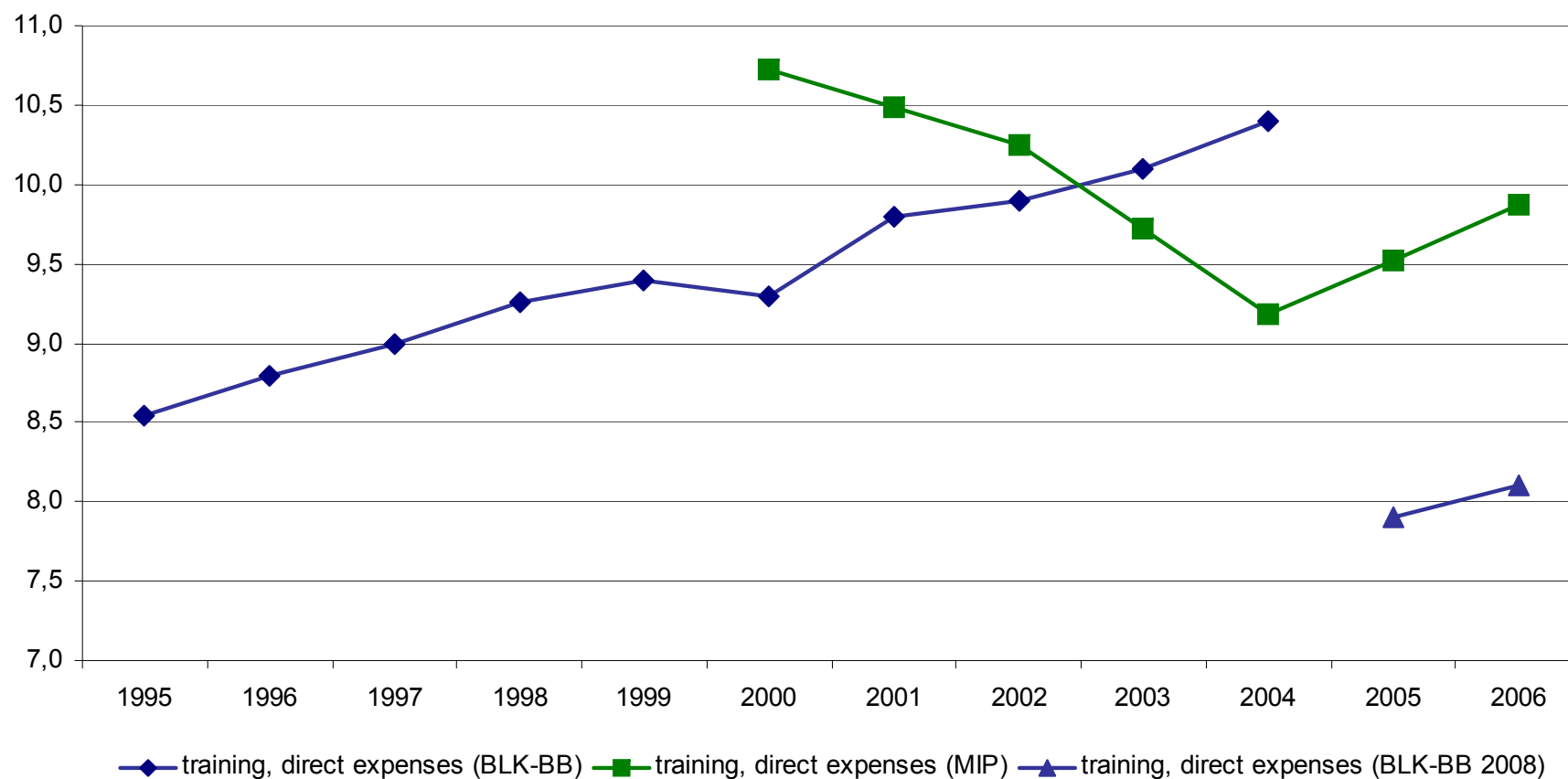
■ *Disadvantages:*

- Only *direct* training costs
- No long time series
- Some economic sectors are not included (e.g. agriculture and construction, retail available only until 2002, figures are estimated from 2003 onwards as a constant proportion)



Continuing vocational training

Alternative German data sources





Continuing vocational training

Indirect costs

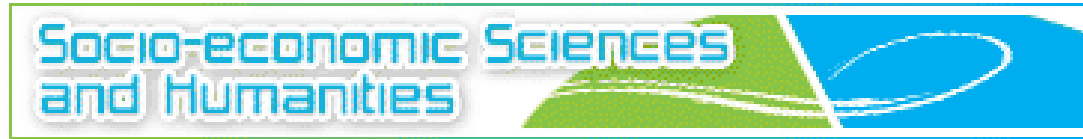
The Institut der deutschen Wirtschaft (IW) Cologne

■ *Advantages:*

- Survey data
- *Direct and indirect* expenses
- Direct costs: all firm's related expenses, including course fees, course materials, travel costs, costs for trainer, etc
- Indirect costs: calculated on the basis of the number of training hours times average wage per hour
- *Proportion of direct costs to total costs: on average 35% (variation between 30% and 39% over the years 1992, 2004 and 2007)*

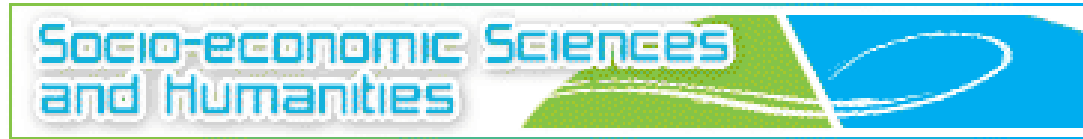
■ *Disadvantages:*

- The data is collected only every three years
- No consistent time series



Measuring firm-specific human capital

- Continuing vocational training
- Apprentice training



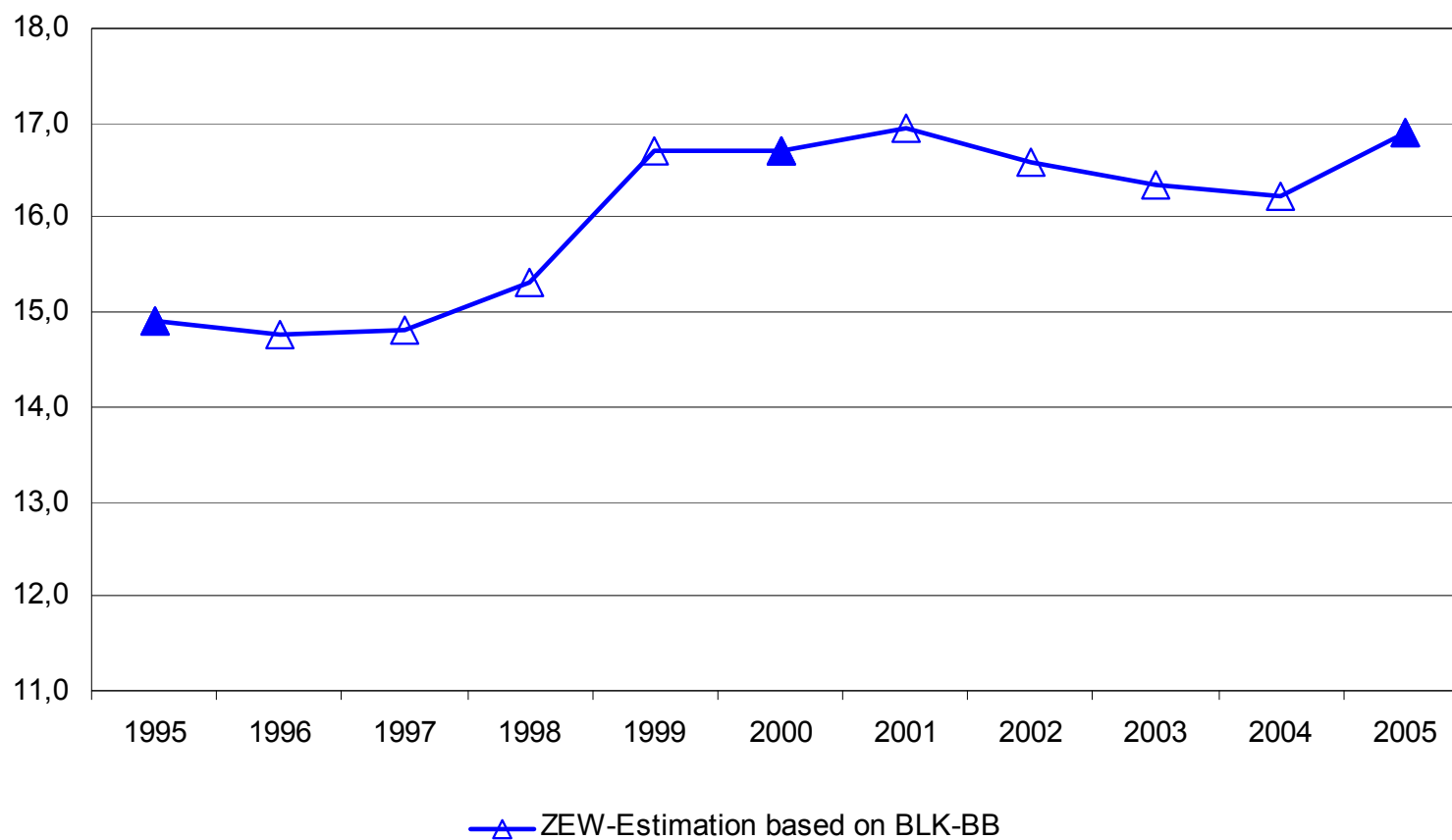
Alternative German Data Source

Federal Statistical Office: BLK-Bildungsbericht (report on education)

- *Advantages:*
 - Publicly available data
- *Disadvantages:*
 - Only companies with 10 employees or more considered
 - No consistent time series due methodological changes over time (last figure for 2005, recalculation of figures only for 1995, 2000).



Apprentice training (bn Euro)





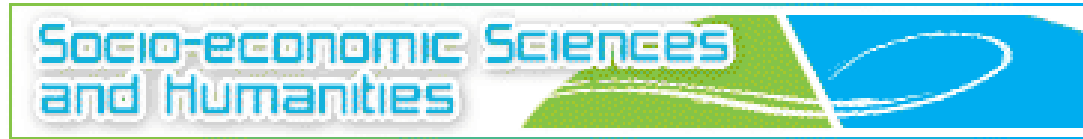
Year	<i>Firm-specific human capital</i>					
	<i>Starting point HMA (2008)*</i>	<i>Training</i>		<i>Apprentice training based on BLK-BB</i>	<i>Total firm-specific human capital expenses</i>	<i>in % of HMA</i>
		<i>training, direct expenses** (MIP)</i>	<i>training, direct and indirect expenses (MIP)***</i>			
1995	26023					
1996	26281					
1997	26394					
1998	26957					
1999	27672					
2000	28733	10720	30630	16700	47330	165%
2001	29270	10485	29957	16940	46897	160%
2002	29467	10249	29284	16580	45863	156%
2003	29551	9718	27764	16340	44104	149%
2004	29673	9186	26245	16219	42464	143%
2005		9526	27216	16900	44116	
2006		9865	28187			
2007						

Source: HAO (2008), ZEW, Destatis

*) "Time series of intangible investment in France and Germany from Hao, Manole and van Ark (2008), sponsored by EU KLEMS. Not to be redistributed without the permission of the offerers."

***) Figures for 1995-1999 not yet available.

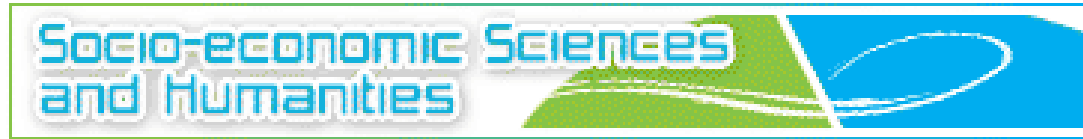
***) Indirect expenses (35% of total expenses) are estimated based on IW survey data.



Spending and Investment on Intangibles as % of GDP (2004)



<i>Asset ITEM</i>	<i>Spending (% GDP) in intangible assets 2004</i>		<i>Investment (% GDP) in intangible assets 2004</i>	
	<i>Hao et al. (2008)</i>	<i>ZEW (2009)</i>	<i>Hao et al. (2008)</i>	<i>ZEW (2009)</i>
1. Computerized information	0,71	0,71	0,71	0,71
a) Computer software	0,69		0,69	
b) Computerized databases	0,02		0,02	
2. Innovative property	3,47	2,94	3,47	2,94
a) R&D, including social sciences and humanities	1,69		1,69	
b) Mineral exploration and evaluation	0,00		0,00	
c) Copyright and license costs (Creative Industries)	0,20		0,20	
d) Development costs in the financial industry	0,70	0,18	0,70	0,18
e) New architectural and engineering designs	0,87		0,87	
3. Economic competencies	3,27	4,67	2,88	4,08
a) Brand equity	0,84	1,66	0,56	1,19
<i>Advertising expenditure</i>	0,69	1,52	0,41	0,91
<i>Market research</i>	0,15	0,14	0,15	0,28
b) Firm-specific human capital	1,34	1,92	1,34	1,92
<i>Continuing vocational training</i>		0,73		0,73
<i>Apprentice training</i>		1,19		1,19
c) Organizational structure				
<i>Purchased</i>	0,50		0,50	
<i>Own account</i>	0,59		0,47	
Total Spending	7,45	8,32		
Total Investment			7,05	7,74



Contribution of Intangible Assets to Economic Growth

(yet without adjustment to new training figures)



<i>Time Period: 1995-2004</i>	<i>Excluding IC</i>	<i>Including Intangible Capital</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Labour productivity growth	1,72	1,855	1,886	1,886	1,872	1,875	1,863	1,805	1,813
ICT tangible capital deepening (ex. Software)	0,34	0,300	0,300	0,300	0,298	0,300	0,297	0,302	0,299
Non-ICT tangible capital deepening	0,64	0,519	0,518	0,518	0,515	0,518	0,512	0,522	0,516
Intangible Capital deepening		0,534	0,590	0,590	0,566	0,563	0,565	0,500	0,531
Labour Quality	0,08	0,093	0,092	0,092	0,092	0,093	0,092	0,094	0,093
TFP	0,65	0,410	0,386	0,386	0,400	0,401	0,397	0,387	0,374
Software		0,091	0,091	0,091	0,091	0,091	0,090	0,092	0,091
Innovative Property		0,347	0,346	0,346	0,344	0,346	0,343	0,311	0,308
Economic Competency		0,097	0,153	0,153	0,131	0,126	0,132	0,097	0,132

0: Benchmark (Hao et al. 2008)

Alternative data for brand equity (all other time series as in HAO et al. 2008)

1: Turnover tax statistics

2: SBS – Eurostat

3: Gross advertising investments (ZAW)

4: Net advertising investments (ZAW)

5: Internal & external gross advertising investments (ZAW+MIP)

Alternative data for new product dev. in financial industry (all other time series as in HAO et al. 2008)

6: New product dev. Costs in the financial industry (MIP), otherwise HMO time series

7: Preferred time series (5+6)



Decomposition of Labour Productivity Growth

<i>Time Period: 1995-2004</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Labour productivity growth	1,855	1,886	1,886	1,872	1,875	1,863	1,805	1,813
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Economic Competency	0,097	0,153	0,153	0,131	0,126	0,132	0,097	0,132
<i>Time Period: 2000-2004</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Labour productivity growth	1,440	1,383	1,449	1,382	1,391	1,363	1,385	1,308
TFP	-0,041	-0,082	-0,031	-0,077	-0,076	-0,078	-0,035	-0,072
Innovative Property	0,312	0,310	0,311	0,309	0,311	0,308	0,244	0,241
Economic Competency	0,107	0,097	0,107	0,096	0,096	0,084	0,107	0,085
<i>Time Period: 1996-2000</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Labour productivity growth	2,188	2,289	2,348	2,263	2,263	2,263	2,141	2,216
TFP	0,770	0,760	0,828	0,782	0,783	0,777	0,724	0,731
Innovative Property	0,375	0,375	0,352	0,373	0,375	0,371	0,365	0,362
Economic Competency	0,089	0,198	0,135	0,158	0,150	0,170	0,089	0,171

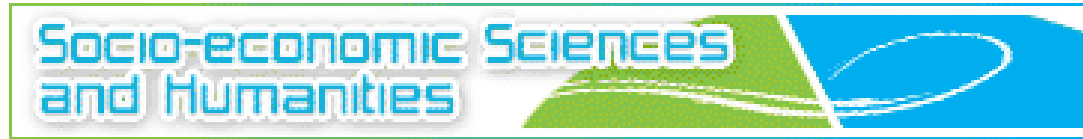
- 0: Benchmark (Hao et al. 2008)
- 1: Turnover tax statistics
- 2: SBS – Eurostat
- 3: Gross advertising investments (ZAW)
- 4: Net advertising investments (ZAW)
- 5: Internal & external gross advertising investments (ZAW+MIP)
- 6: New product dev. Costs in the financial industry (MIP), otherwise HMO time series
- 7: ZEW data selection



Decomposition of Labour Productivity Growth

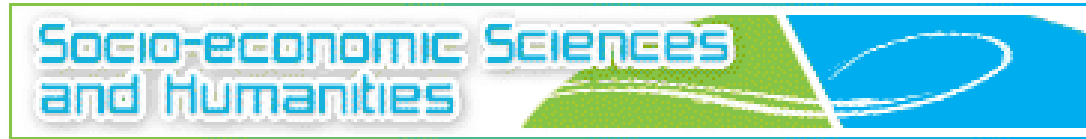
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Labour productivity growth	2,188	2,216
TFP	0,770	0,731
Innovative Property	0,375	0,362
Economic Competency	0,089	0,171

0: Benchmark (Hao et al. 2008)
7: Preferred time series



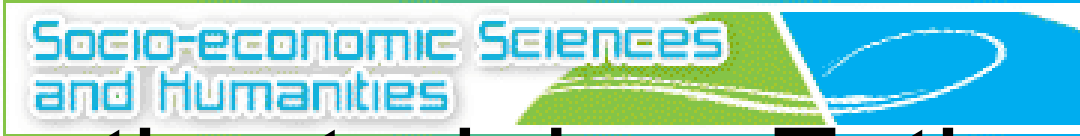
Outlook: From Macro to Micro

- Firm-level productivity estimates based on CIS: productivity growth 2006-2007 explained by
 - Physical capital, labour, material
 - R&D intensity
 - Non-R&D related innovation intensity (for external knowledge, design and product preparation, excluding tangible investments related to innovation)
 - Marketing intensity
 - Training intensity
- Complementarities between tangibles and intangibles as well as different intangibles

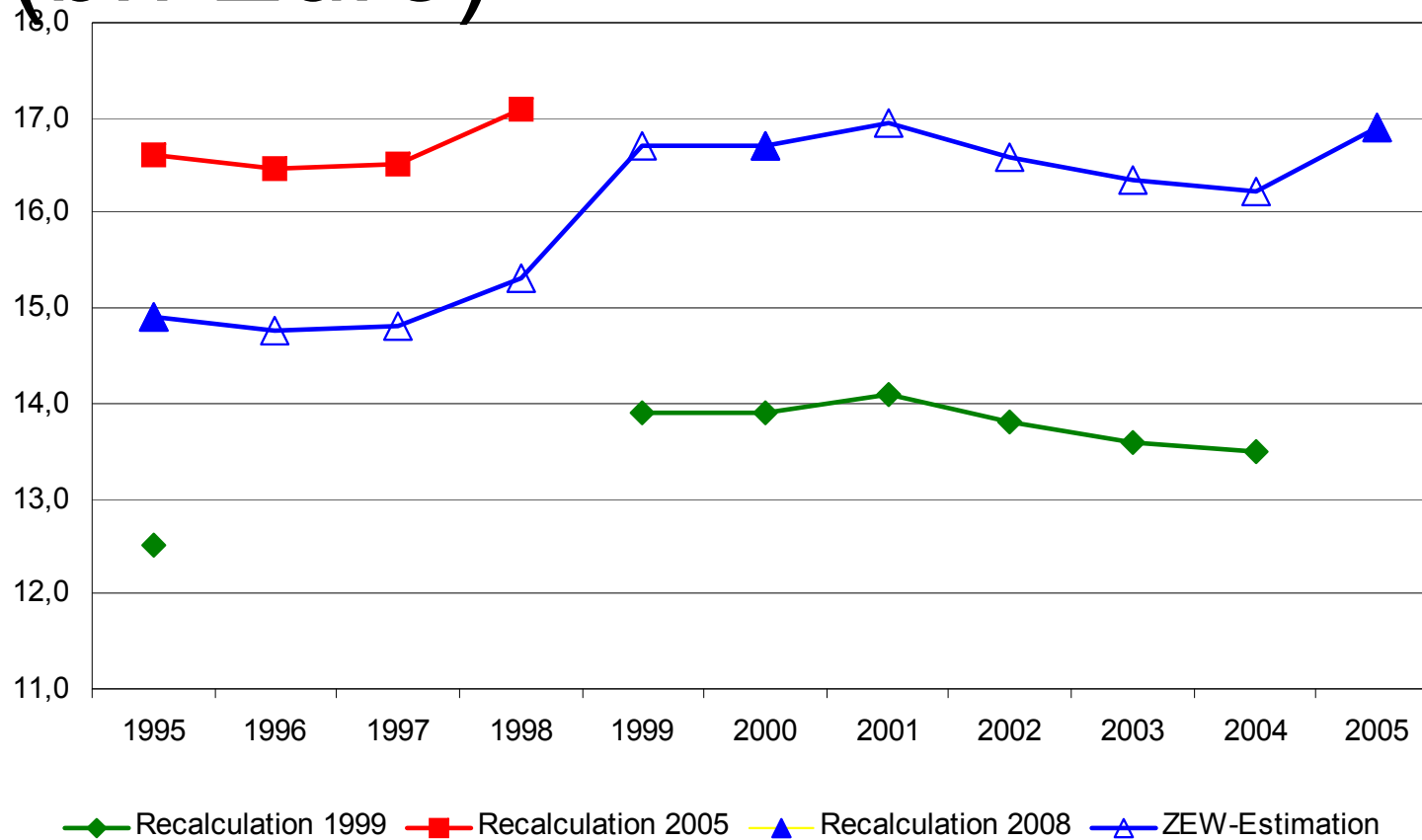


Thank you for your attention.

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Apprentice training: Estimates (bn Euro)



x1

Backup-Folie:

Das Statistische Bundesamt hat seine Angaben mehrmals neu berechnet. Leider jedoch nicht für die gesamte Zeitreihe.

Die "ZEW-Estimation" beruht auf den Angaben zu den einzelnen Jahren und nutzt als Umrechnungsfaktoren die Angaben zum Basisjahr 1995...

xxx, 25/09/2009



Measuring Brand Equity (Presentation Paris, June 2, 2009)



Measuring Brand Equity

- Alternative German data sources

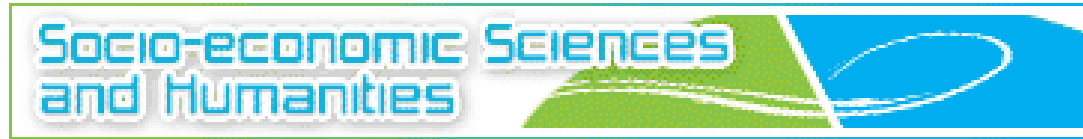
Turnover tax statistics

- *Advantages:*

- Publicly available time series data
- Annual data since 1996 (before that on a biennial basis)
- Census from the data of the tax authorities that covers nearly all economic sectors with high quality. It is not based on a sample survey such as the structural business statistics used in Hao et al. (2008).
- Disaggregated data on advertising (74.4), market research (74.13.1) and opinion research (74.13.2) available

- *Disadvantages:*

- The dataset does not provide information about non-taxable transactions like in-house marketing activities
- Industry assignments are based on the product or service generating the majority of turnover. Hence, firms with minor marketing-related activities may be assigned to other industries (those with the majority of turnover) and vice versa.



Measuring Brand Equity

- Alternative German data sources:

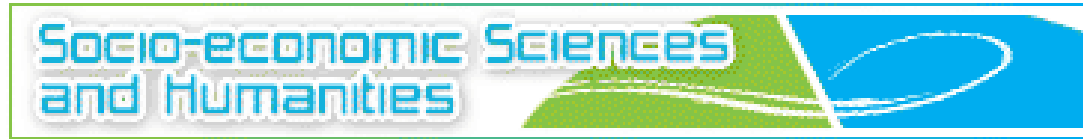
Central Association of the German Advertising Industry (ZAW)

■ *Advantages:*

- Publicly available time series data since the mid eighties.
- Broad coverage of all advertising activities and media channels.
- Allows a distinction between net advertising expenditure (media revenues) and gross advertising expenditures (includes also expenditures for the design/production of advertising content and material).
- Primary industries commissioning advertising (Top 25) can be identified.
- Weights of different advertising channels (e.g. TV, newspapers, direct mail) can be identified.

■ *Disadvantages:*

- No information on market research
- No information on the size or scope of marketing activities within non-advertising firms (e.g. in-house market research, packaging, design).



Measuring Brand Equity - Market Research



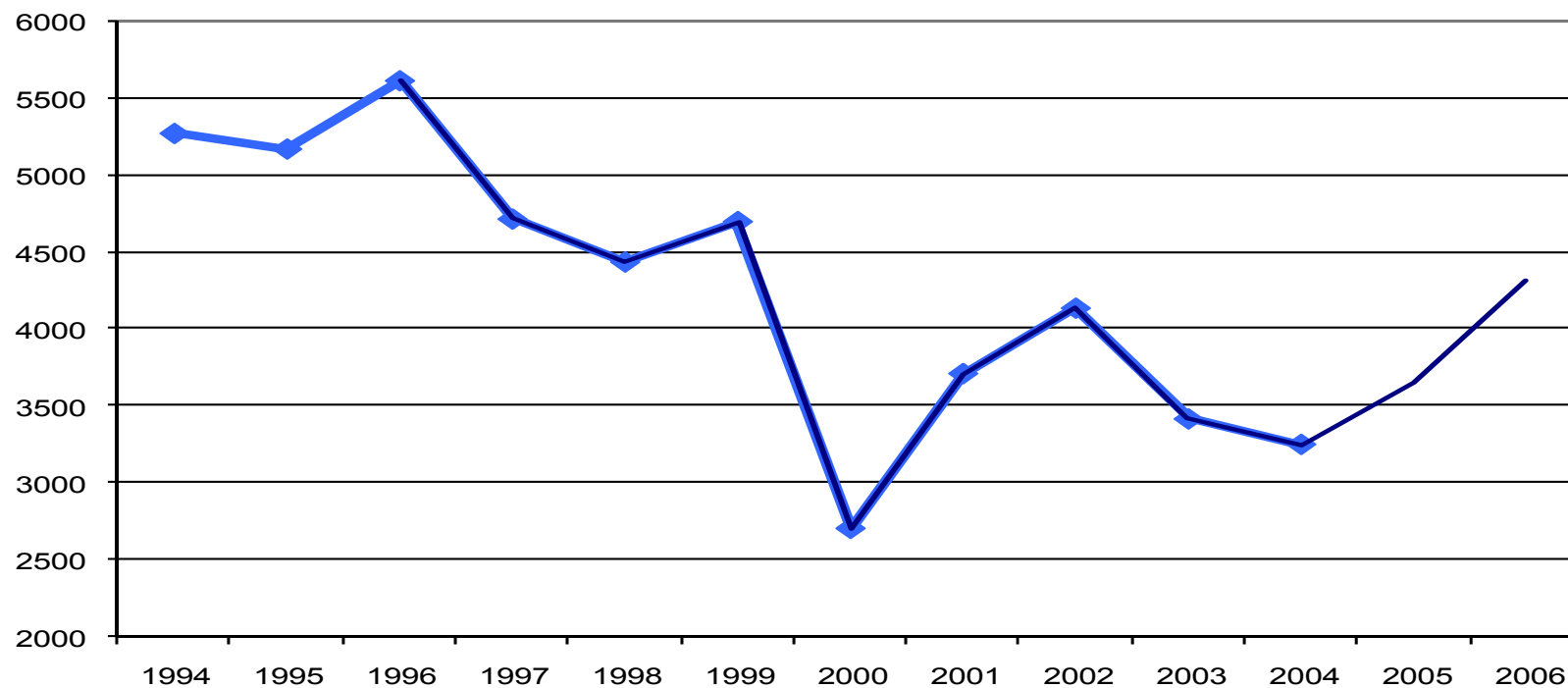
Market Research Expenditures (mn EUR)

Year	<i>Market research expenditures (original data)</i>			
	<i>SBS - Eurostat (74.13)</i>	<i>Turnover tax statistics: Market and opinion research (74.13)</i>	<i>Turnover tax statistics: Market research (74.13.1)</i>	<i>Turnover tax statistics: Opinion research (74.13.2)</i>
1994		3052	2994	58
1995				
1996	2812	2745	2604	141
1997	2360	2370	2216	154
1998	2220	2235	2030	205
1999	2352	2352	2120	232
2000	1350	2183	1885	297
2001	1856	2215	1920	294
2002	2069	2282	2001	281
2003	1707	2446	2105	341
2004	1624	3107	2652	455
2005	1828	2637	2261	376
2006	2158	2716	2311	405
2007		2833	2413	420

Source: SBS Eurostat, German turnover tax statistics



Investments in Market Research (mn EUR)

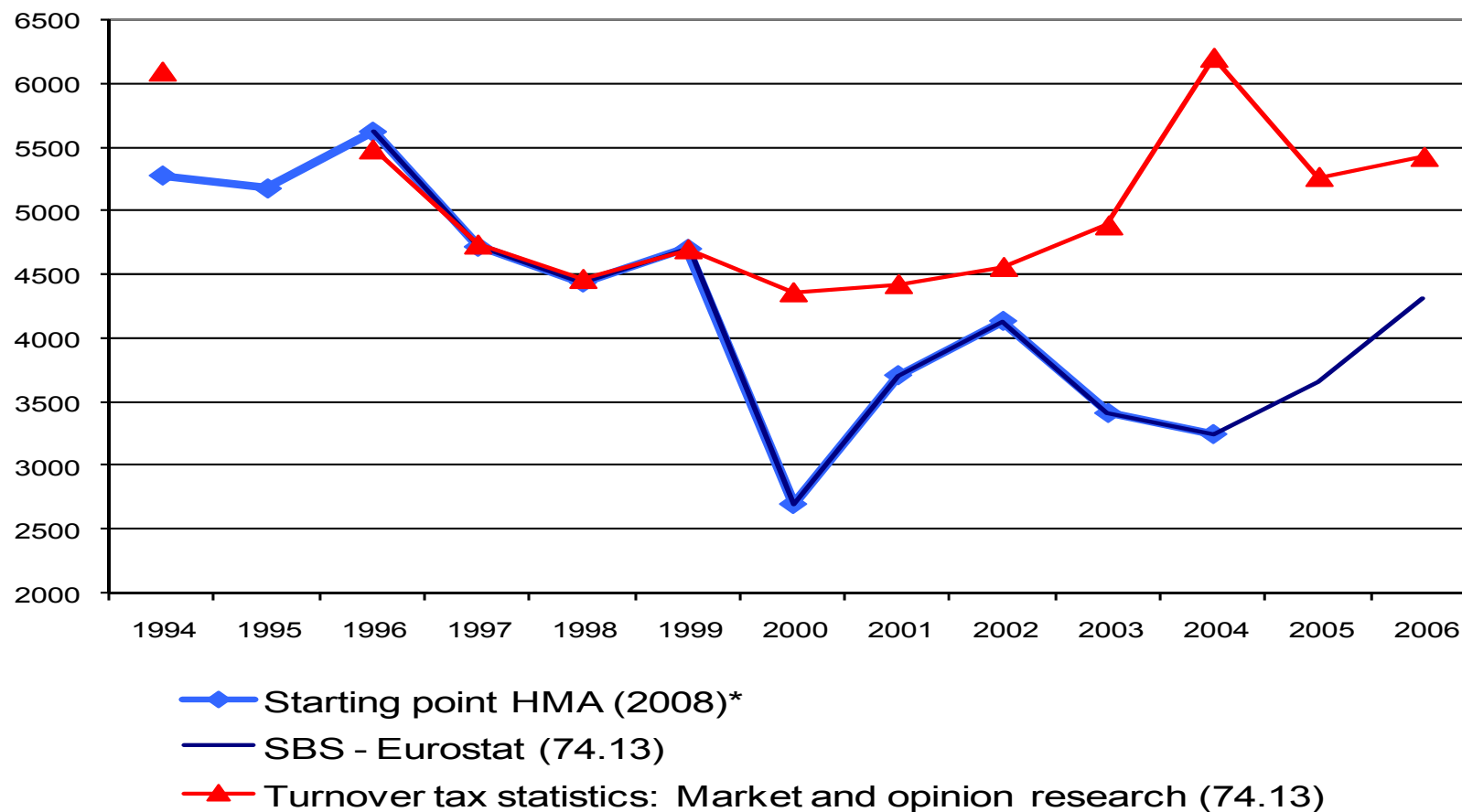


Starting point HMA (2008)*

SBS - Eurostat (74.13)

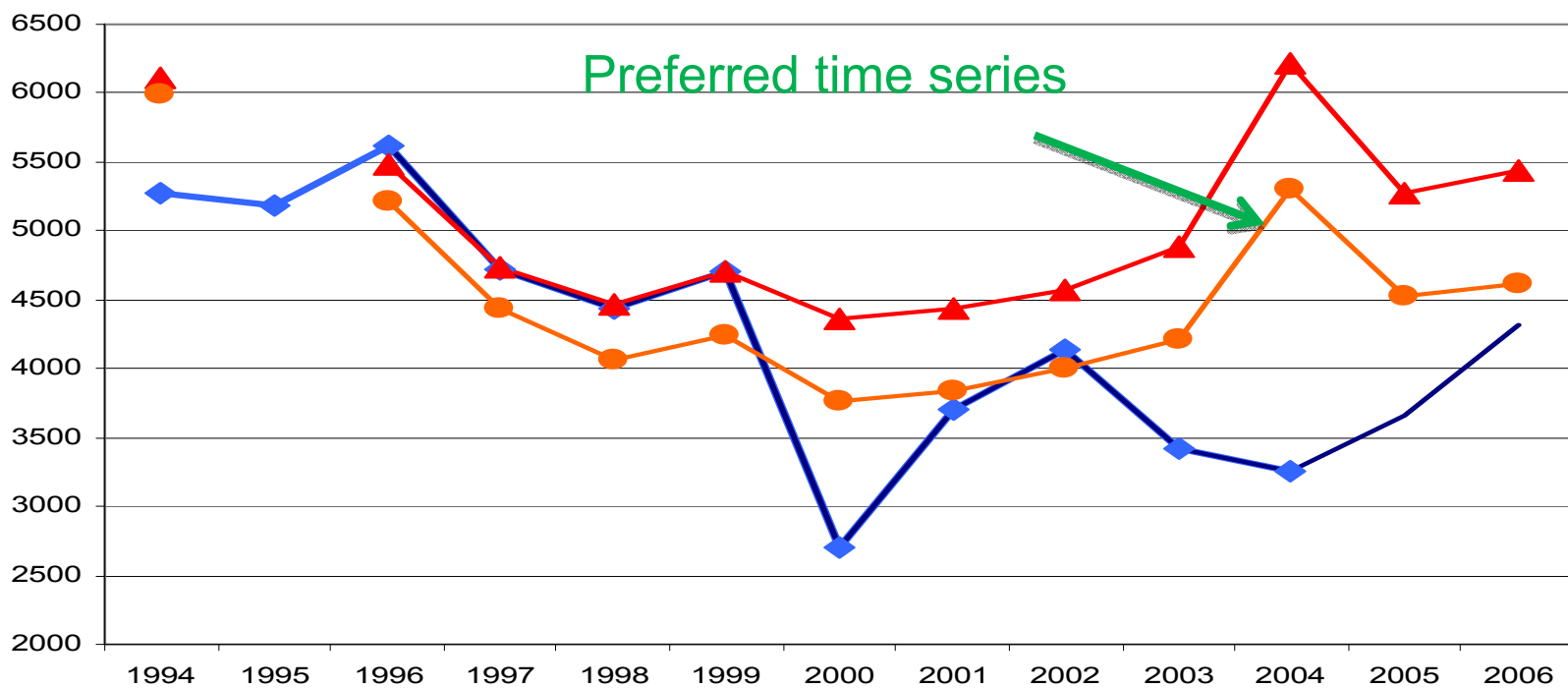


Investments in Market Research (mn EUR)

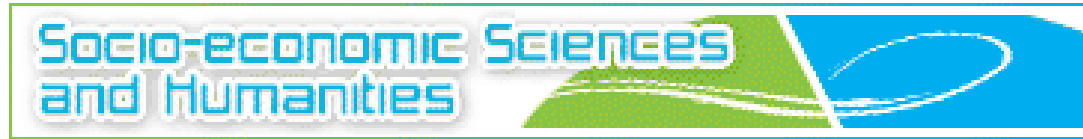




Investments in Market Research (mn EUR)



- Starting point HMA (2008)*
- SBS - Eurostat (74.13)
- Turnover tax statistics: Market and opinion research (74.13)
- Turnover tax statistics: Market research (74.13.1)



Measuring Brand Equity - Advertising



Advertising expenditures, altern. data sources (mn EUR)

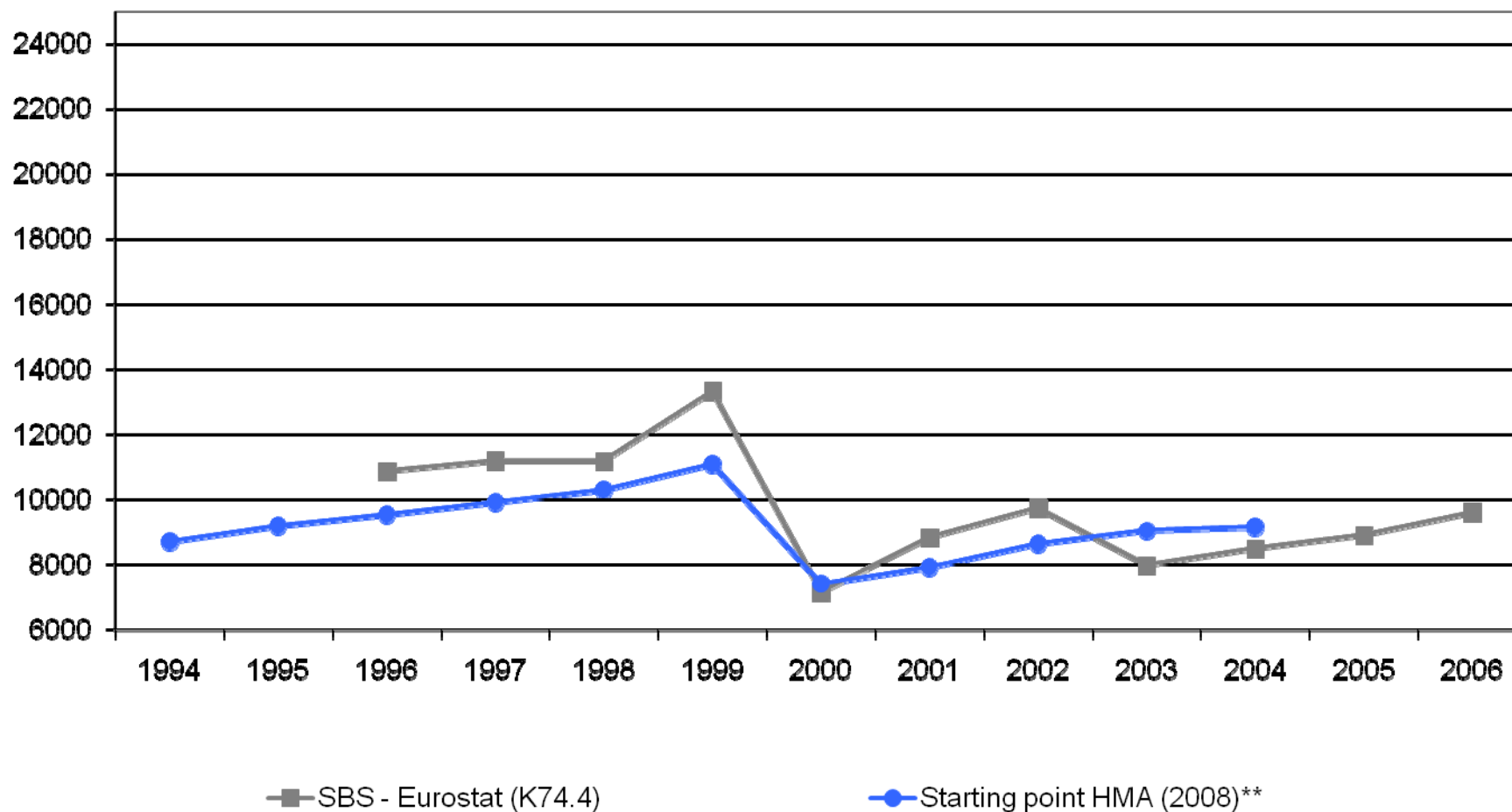
Year	<i>Advertising expenditures (original data)</i>				
	<i>Turnover tax statistics: Advertising (74.4)</i>	<i>SBS - Eurostat (K74.4)</i>	<i>Gross advertising expenditures (ZAW)</i>	<i>Advertising net revenues of the media (ZAW)</i>	<i>Advertising net revenues of newspapers (ZAW)</i>
1991			22190	14495	4753
1992			24031	15983	5126
1993			25360	16320	5059*
1994	19261		25974	17348	5300
1995			27405	18580	5481
1996	20369	20863	28070	19066	5460
1997	21532	21439	28939	19780	5557
1998	21735	21588	30170	20790	5868
1999	25309	25309	31440	21820	6142*
2000	27646	15235	33210	23380	6560
2001	25895	17568	31460	21720	5640
2002	22995	18747	29620	20140	4940
2003	22839	15545	28910	19280	4450
2004	23347	16431	29220	19580	4500
2005	24025	17102	29600	19833	4480
2006	25797	18308	30230	20350	4530
2007	27214		30780	20812	4570
2008			30670	20357	4373

*) own estimation

Source: SBS Eurostat, German turnover tax statistics, ZAW (1991-2008), own calculations.

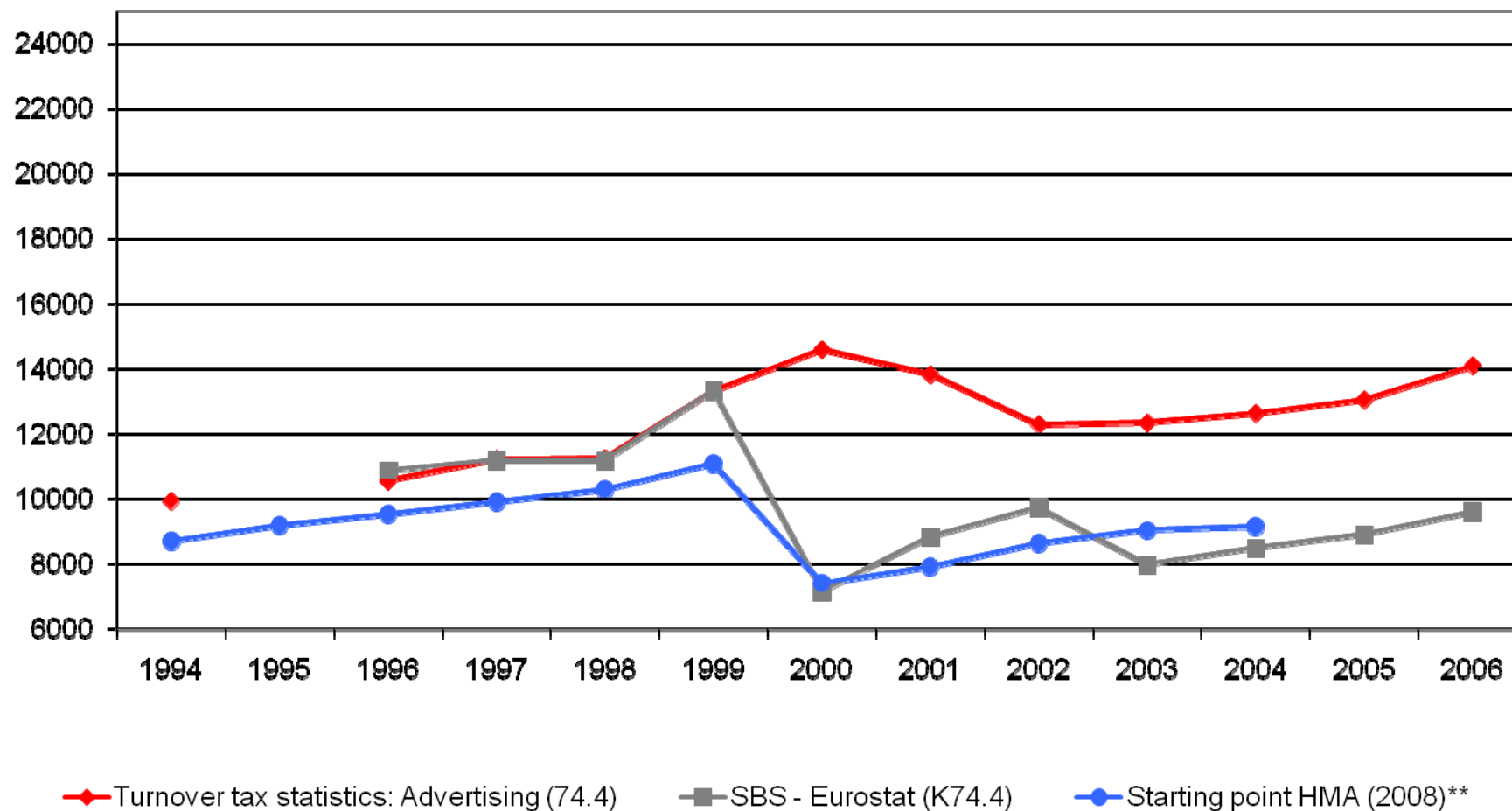


Advertising Investments (mn EUR)



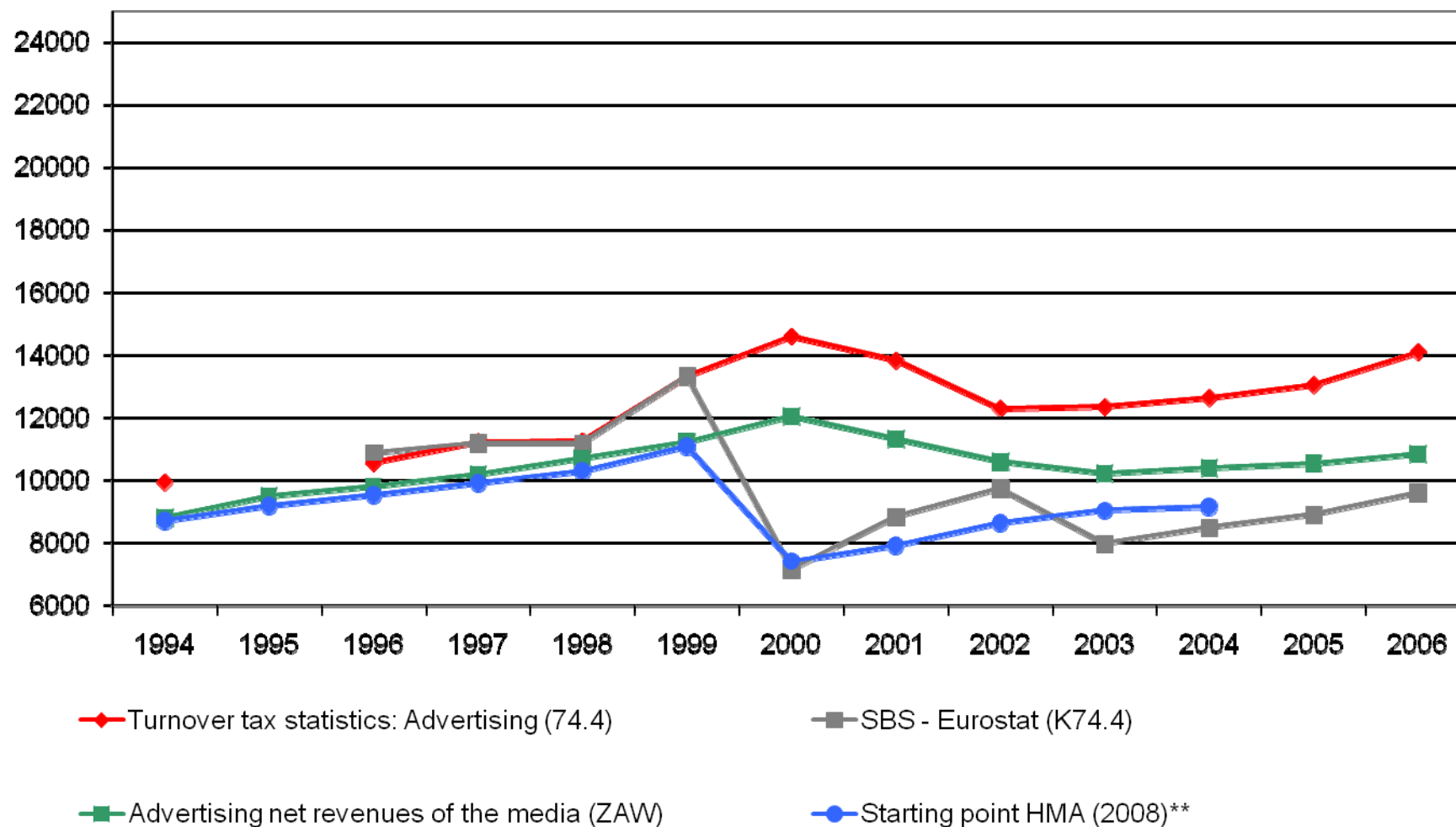


Advertising Investments (mn EUR)



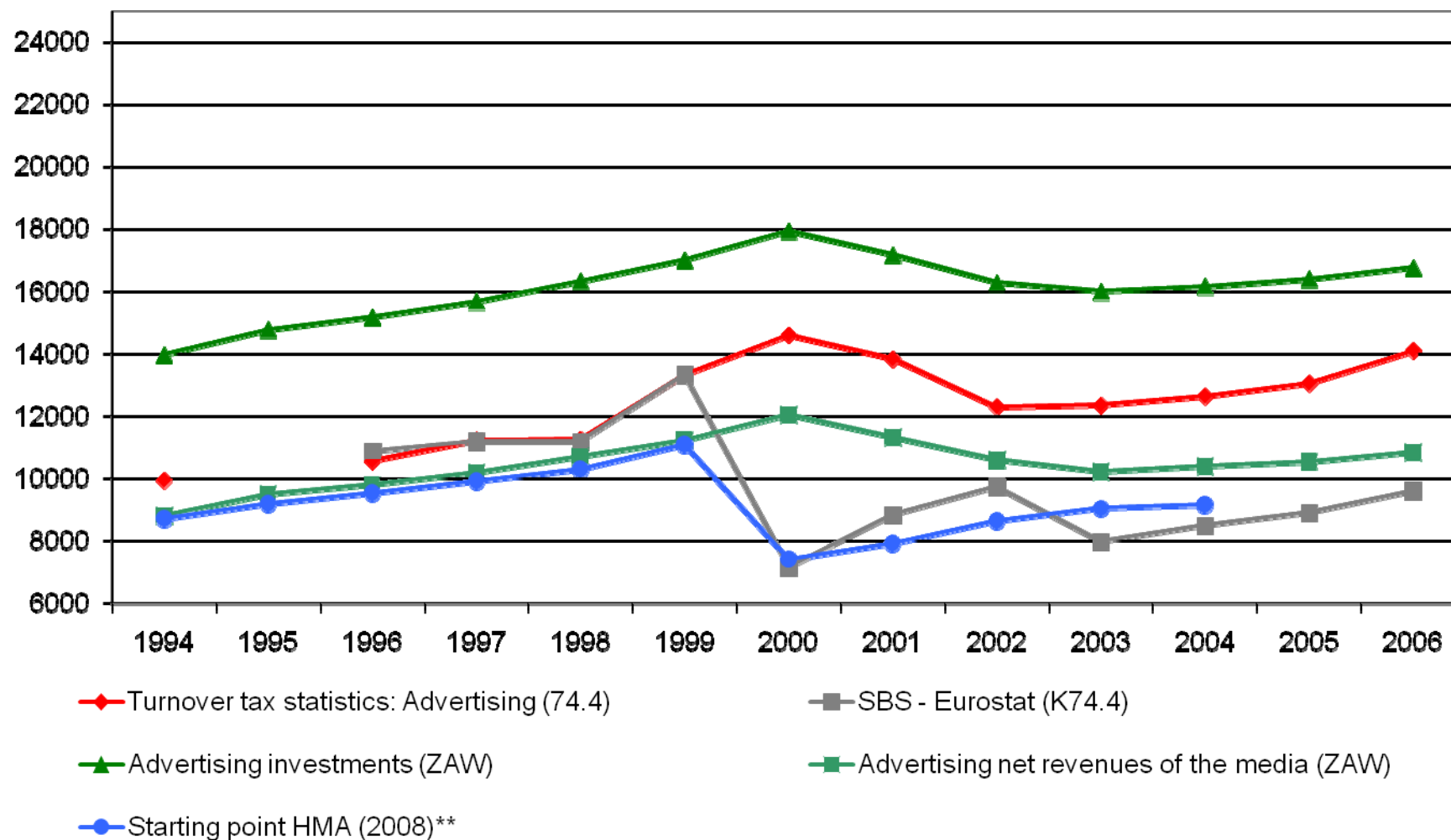


Advertising Investments (mn EUR)



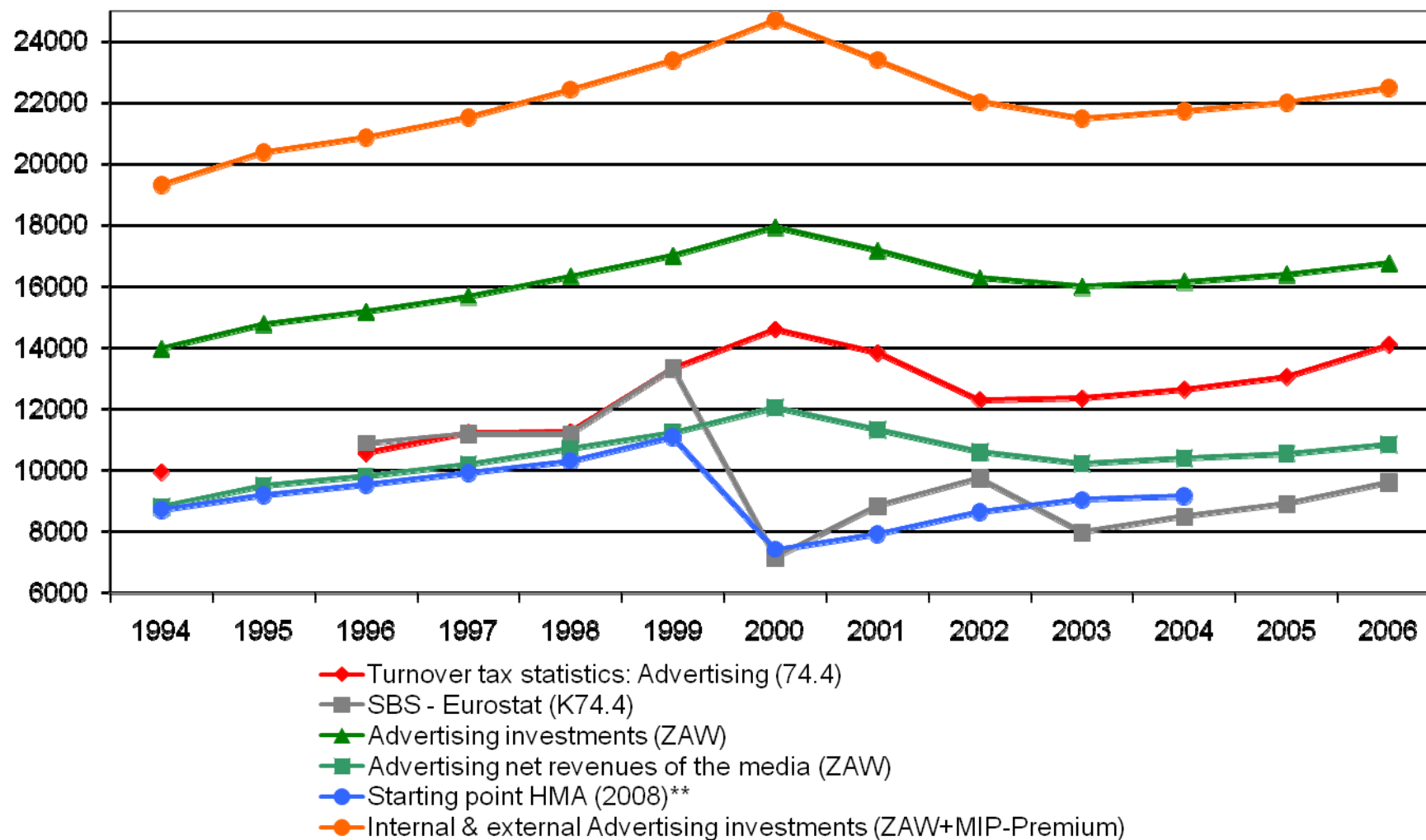


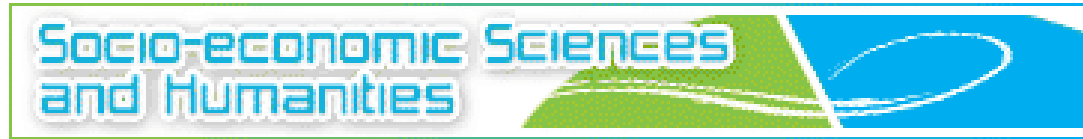
Advertising Investments (mn EUR)





Advertising Investments (mn EUR)





Conclusion and Discussion

- Problem of structural break in year 2000 in SBS data (EU KLEMS) in Germany due to introduction of service statistics
- ZAW data and turnover tax statistics more similar and stable over time
- Accounting for gross or net advertising expenditures (production costs, etc.)? → estimate of 30%
- Subtracting opinion research from market research (7413)? → problem: increasing share over time
- Accounting for internal marketing expenditures in definition? → estimate of 24%