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Cross-Section Analysis of Health Spending with Special Regard to Trends in Austria

Maria M. Hofmarcher

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Abstract

During the 90s the increase in health spending which compared to the overall growth had taken place at a rather rapid pace experienced a worldwide slow-down. In relation to overall economic growth and the expansion of other countries' health care systems, Austria's system grew below average- a fact which holds particularly true for the years between 1990 and 1997. This development may largely be due to a constant consolidation of budget and relatively high prices for private households which are possibly overestimated, however. This overestimation of prices are probably caused by unascertained productivity improvements which may have occurred in the acute care sectors. Within our observation period of 16 years, the private households' expenditure reached a peak with spending on physician services experiencing the fastest increase. Although overestimated, the high prices in the health sector together with sharply rising consumption expenditure on health care constitute an increased burden on households.

Zusammenfassung

Je reicher ein Land ist, um so mehr wird für den Gesundheitssektor ausgegeben. Das relativ schnellere Wachstum der Gesundheitsausgaben ist – global betrachtet – in den 90er Jahren träger geworden. Im Verhältnis zum Wirschaftswachstum und im Vergleich mit anderen Ländern ist das reale Wachstum der Gesundheitsausgaben pro Kopf in Österreich vor allem in der Periode 1990 bis 1997 unterdurchschnittlich. Budgetkonsolidierung, relativ hohe Preise für die privaten Haushalte, die allerdings auch systematisch überschätzt sein dürften, bei gleichzeitig nicht erfaßten, aber ziemlich wahrscheinlichen Produktivitätsfortschritten in den Kernbereichen des Gesundheitssektors, könnten die Ursachen für diese Entwicklung sein. Die Ausgaben der privaten Haushalte verzeichneten innerhalb von 16 Jahren das größte Plus. Am raschesten wuchsen die Ausgaben für Ärztliche Dienste. Im Lichte der, wenngleich wahrscheinlich überschätzten, Preisentwicklung bedeutet die Kombination aus relativ hohen Preisen und stark wachsenden Konsumausgaben für Gesundheit eine verstärkte Belastung für die privaten Haushalte.

Keywords

Health Expenditures, Cross Section, Estimation of, European Union, Austria

Schlagworte

Gesundheitsausgaben, Querschnittsanalyse, Schätzung, Europäische Union, Österreich

JEL Classifications

C21, C22, I10

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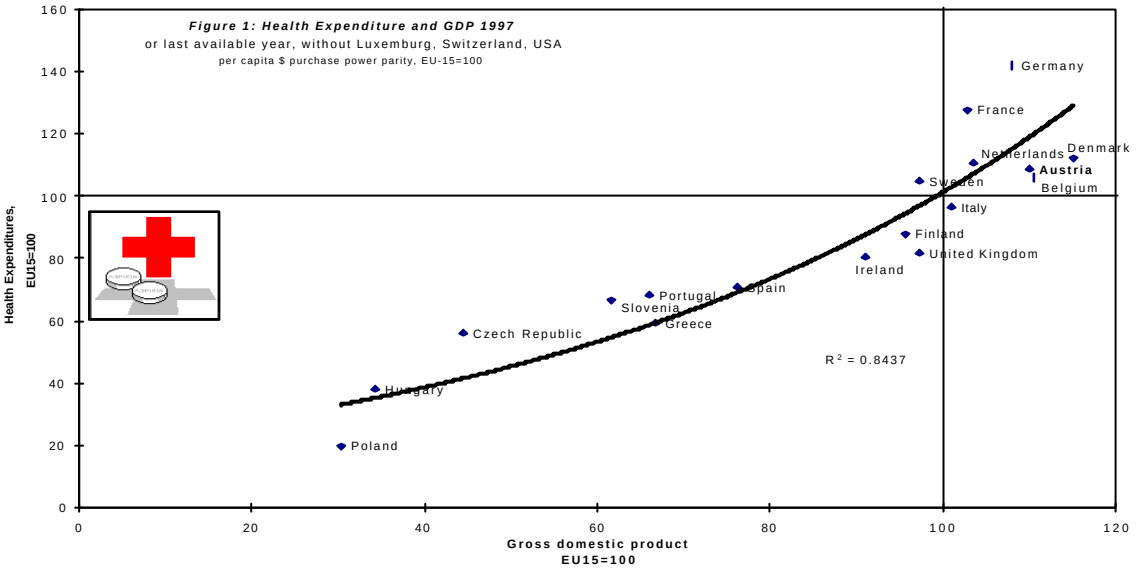
1 Introduction: The richer a country, the higher its expenditure on health care

In contrast to a linear correlation, the exponential trend depicted in figure 1 not only demonstrates that the development of health spending interacts with the development of the GDP but also shows that after a certain level of income an increase in earnings is accompanied by a disproportionately sharp rise in health care expenditure.

Relative to the respective GDP-level, health care expenditures in Poland, in Slovenia and in Greece are lower compared to the EU-average. In rich countries, for example



Austria, Belgium, France, Germany, the Netherlands, Switzerland and the USA, the amount spent on health care is high relative to GDP.

In the following sections we will closely examine the relationship between GDP and health care spending and in particular estimate the elasticities of health care expenditure with respect to income[1]. For this purpose the relationship between health

[1] The concept of elasticities gives us the chance to quantify by how many percent health spending - ceteris paribus - rises when the aggregate income increases by one percent. An income elasticity of one indicates that a one-percent increase in income leads to a one-percent rise in spending (constant elasticity). If the elasticity ranges above one, spending is increasing more rapidly than income (which makes health care services appear to be a luxury good). From the beginning of the 70s economists have been engaged in an empirical analysis of the relationship between health spending and aggregate income. To get a better understanding of their various approaches, please see Gerdtham, U.-G. et al.: An econometric analysis of health care expenditures: A cross section study of the OECD-countries, *Journal of Health Economics* 11 (1992), p. 63-84, North Holland; Mc Gurie, A. et al.: Econometric analysis of National Health expenditures: Can positive economics help to answer normative questions? *Health Economics* 2 (1993), p. 113-126; OECD: Factors affecting health spending: a cross country econometric analysis, Annex A, *New Directions in Health Care Policiy, Health Policy Studies* 7, p. 71-88, Paris.

care expenditure and aggregate income is depicted by means of a line. The slope of the line is estimated in a cross-section approach which captures all the respective countries[2]. Based on percentage changes in aggregate income, percentage changes in health spending help to understand how distinct income levels affect the level of health care expenditure[3].

2 Cross Country Estimation

The relation between Health Expenditures (HE per capita) and GDP (per capita) was measured by a linear regression model for the log of the values. For justifying the linearity of the relationship both variables were transformed with the logarithm function:

$$\log(HE)_i = \alpha_i + \beta \cdot \log(GDP)_i \qquad (1)$$

and elasticities have been computed for the years 1991, 1994, 1996 and 1997. In this simple model 1 no time trend was considered.

In a second model a least square dummy variable approach (Fixed Effects)[4] was employed to capture both time and country inter-correlation. Extending the least square dummy variable approach by considering the time specific effects has the general form, where country specific dummies are represented by α_i and time specific dummies by γ_t:

$$y_{it} = \alpha_i + \gamma_t + \beta x_{it} + \varepsilon_{it} \qquad (2)$$

Thus, in our case we have the following model with dummy variables for country and time:

$$\begin{aligned}\log(HE)_{it} &= const + \beta \cdot \log(GDP)_{it} + \gamma_1 \cdot Dummy91 + \gamma_2 \cdot Dummy94 + \alpha_1 \cdot Belgium \\ &+ \alpha_2 \cdot Denmark + \alpha_3 \cdot Finland + \alpha_4 \cdot France + \alpha_5 \cdot Germany + \alpha_6 \cdot Greece \\ &+ \alpha_7 \cdot Ireland + \alpha_8 \cdot Italy + \alpha_9 \cdot Luxembourg + \alpha_{10} \cdot Netherlands + \alpha_{11} \cdot Portugal \\ &+ \alpha_{12} \cdot Spain + \alpha_{13} \cdot Sweden + \alpha_{14} \cdot UK + \varepsilon_{it}\end{aligned}$$

---

[2] With regard to new findings that had been made concerning the functional relationship between health spending and GDP (double-logarithmic function), both variables were measured in logarithms in this analysis. (see further Gerdtham, U.-G. et al. (1992). Even in multiple regressions, the relationship between GDP and health spending turns out to be most pronounced which is why we solely concentrate on this relationship in our analysis.

[3] The following figures also include Luxemburg, Switzerland and the USA.

[4] See Greene , W.H.- Econometric Analysis, Macmillian Publishing Company, New Jersey 1993 p.444-480.

The data base for model 2 was the pool of the countries under consideration with the variables for health care expenditure and GDP (in logarithms) for the years 1991, 1994 and 1997. In this variance-analytical approach the datapoint “Austria 1997” was used as the reference category. The occuring effects have to be interpreted as deviation from “Austria 1997”. The relation between the variables health expenditure and GDP can be seen as adjusted for time and country effects.

3 Decelerated increase in health spending

The ratio between the annual growth in GDP per capita and the annual increase in health spending per capita shows that the goods and services of a health care system appear to be “luxury goods”. From the middle of the 90s, however, the increase in spending has been slowed down all over the globe but particularly in the EU countries. For example, in 1997 the rise in health care expenditure was slightly lower than the increase in income in those countries which had already qualified for the monetary union.

After adjusting for differences in purchasing power expressed in US dollars, GDP and health spending significantly correlated in 1991, 1994, 1996 and 1997. The slope of the lines depicted in figures 2 to 4 shows the elasticity reflecting the relationship between the increase in health spending per capita and the rise in income per capita. Table 1 summarizes the income elasticities of health spending depicted in figures 2 to 5. Furthermore, the countries concerned were classified into certain groups which revealed that the income elasticity of health spending experienced a worldwide decrease by 25% between 1991 and 1997 and amounted to 1.15 in 1997. Relative to aggregate income health spending decreased by 16% between 1991 and 1994 and by 8% between 1994 and 1997. When we compare 1997 to the years 1991 and 1994, we come to the conclusion that either proportionally less money was spent on health care in 1997 or other factors not included in the relationship between GDP and health spending were growing proportionally stronger. Thus, either the formerly „luxurious“ medical services became “necessities” or other factors like structural changes and/or the introduction of new institutional rules or new “market systems“ were growing increasingly dominant.

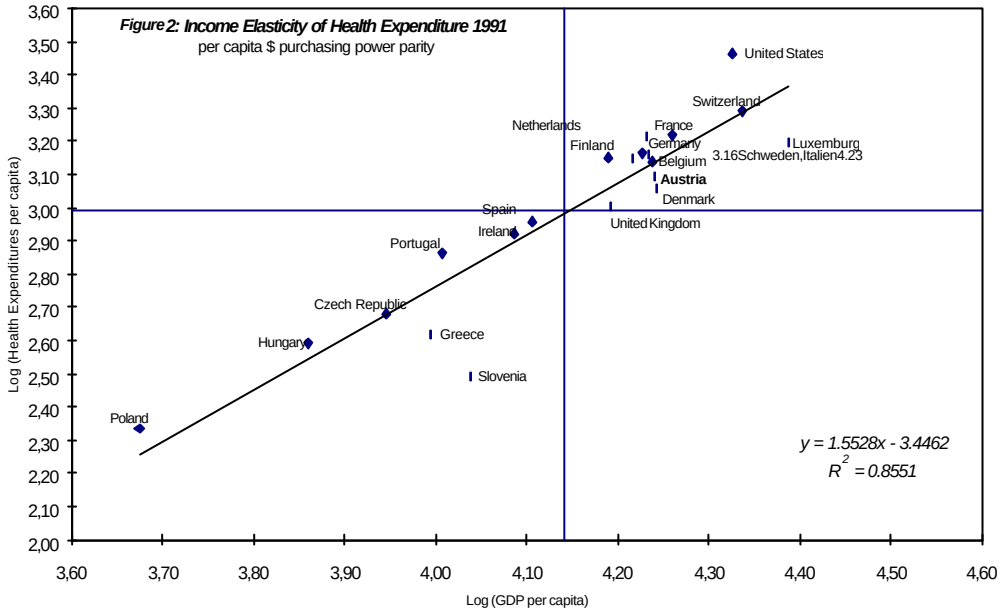


Figure 2: Income Elasticity of Health Expenditure 1991
per capita $ purchasing power parity
United States
Switzerland
Netherlands
France
Finland
Germany
Luxemburg
3.16Schweden,Italien4.23
Belgium
Austria
Denmark
Spain
Ireland
United Kingdom
Portugal
Czech Republic
Hungary
Greece
Slovenia
Poland
y = 1.5528x - 3.4462
R2 = 0.8551
Log (Health Expenditures per capita)
Log (GDP per capita)

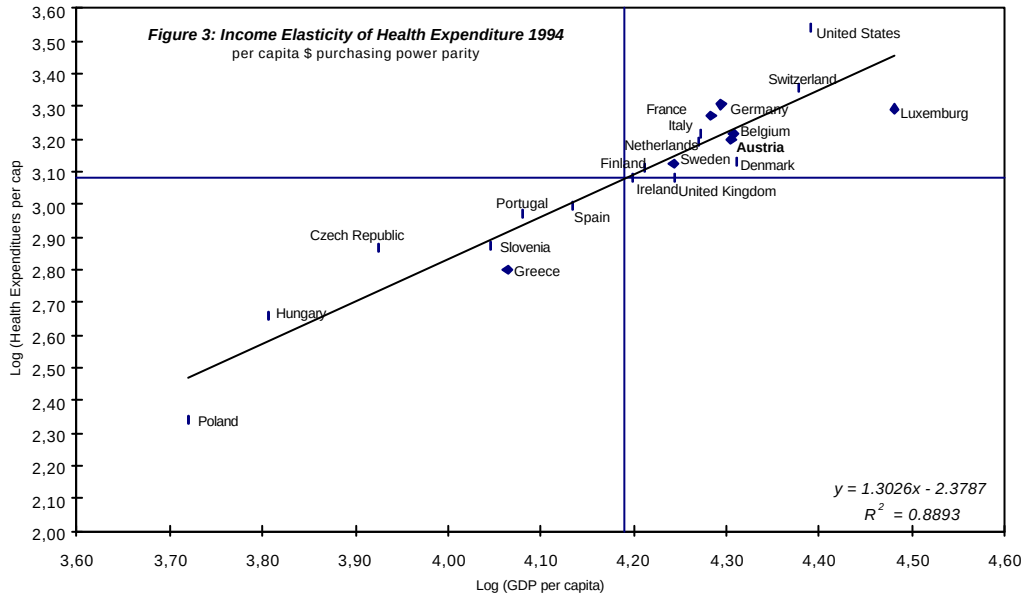
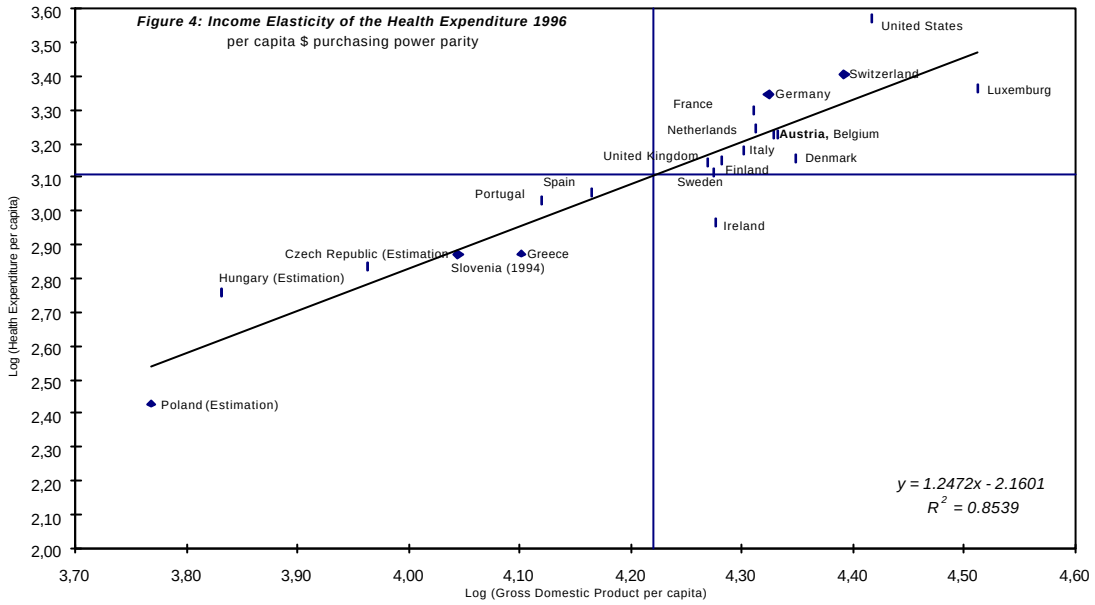
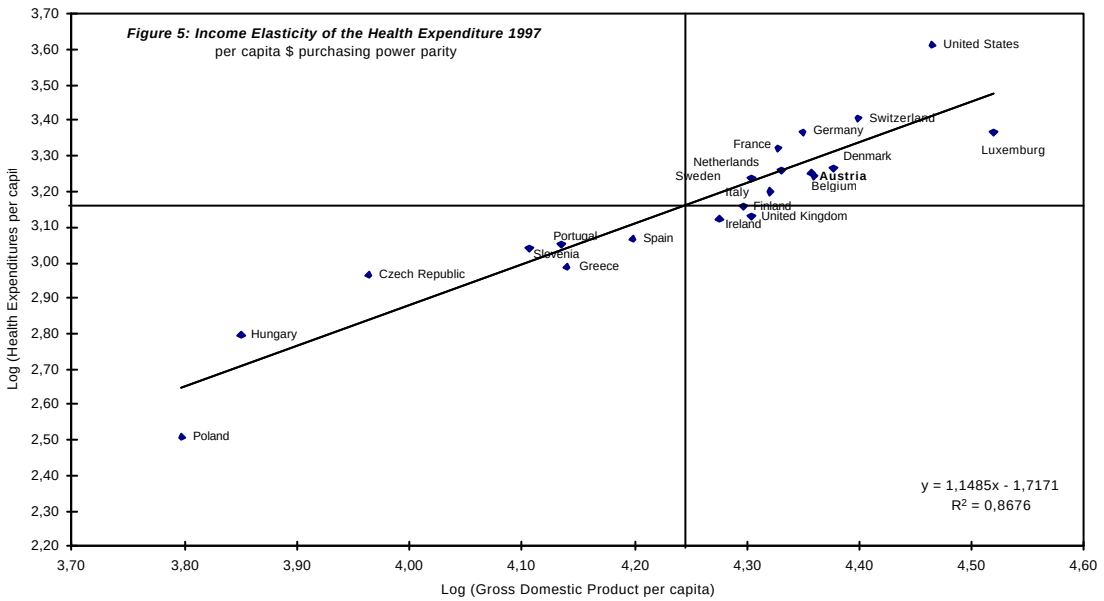


Figure 3: Income Elasticity of Health Expenditure 1994
per capita $ purchasing power parity
United States
Switzerland
France
Germany
Luxemburg
Italy
Belgium
Netherlands
Austria
Finland
Sweden
Denmark
Ireland
United Kingdom
Portugal
Spain
Czech Republic
Slovenia
Greece
Hungary
Poland
y = 1.3026x - 2.3787
R2 = 0.8893
Log (Health Expenditures per cap
Log (GDP per capita)





3.1 Decelerated growth in health care expenditure in EU countries

According to our calculations, it is above all the EU countries which seem to cause a slow-down in the rise of health spending compared to changes in GDP. The cross-section analysis of the relative rise in health spending shows that the elasticity was decreasing by 25% between 1991 and 1997 when it reached 1.05. This development may be due to the EU member states‘ strenuous efforts to meet the convergence criteria for participation in the monetary union. In this context it has to be pointed out that the share of health spending in overall public expenditure accounts for 10 to 20% within the EU. The income elasticity of those 11 European countries which already qualified for participation amounted to 0.98 1996 and 1997, respectively, and thus just failed to reach 1 – a fact which occurs to be a further sign for a decelerated growth in expenditure.

Table 1	*Income elasticity of health spending*				
Model 1	*Cross-section measurement* *dependent variable: health spending per capita $ PPP*				
		1991	***1994***	***1996***	***1997***
All the countries-21 (R^2=0.80-0.88)	log GDP	**1.55**	**1.30**	**1.25**	**1.15**
	(t-value)	*(10.59)*	*(12.36)*	*(10.54)*	*(11.16)*
	constant term	-3.45	-2.38	-2.16	-1.71
	(t-value)	*(-5.67)*	*(-5.38)*	*(-4.32)*	*(-3.91)*
EU-15 (R^2=0.63-0.77)	log GDP	**1.40**	**1.14**	**1.11**	**1.05**
	(t-value)	*(6.52)*	*(6.29)*	*(4.96)*	*(6.65)*
	constant term	-2.82	-1.70	-1.59	-1.32
	(t-value)	*(-3.12)*	*(-2.21)*	*(-1.66)*	*(-1.94)*
EU-11 (R^2=0.53)	log GDP	--	--	**0.98**	**0.98**
	(t-value)			*(3.48)*	*(5.02)*
	constant term	--	--	-1.02	-1.01
	(t-value)			*(-0.85)*	*(-1.20)*
Model 2	*Fixed effects measurements* *dependent variable: health spending per capita $ PPP*				
		1991, 1994, 1997			
		Coefficient		**Confidence Interval**	
EU-15 (R^2=0,978), (F=45.17) *DW: 2.06*	log GDP *(t-value)*	**1.45** *(3.89)*		0.69-2.22	
	constant term *(t-value)*	-3.09 *(-1.89)*			
EU-15, Switzerland, USA (R^2=0,966), (F=72.12) *DW: 2.06*	log GDP *(t-value)*	**1.29** *(3,87)*		0.61-1.96	
	constant term *(t-value)*	-2.35 *(-1.63)*			

GDP: gross domestic product per capita $PPP
t-value: Test statistics for the coefficients. A value ³ 2 confirms the hypothesis that GDP per capita is significantly different from 0 (error probability of 5%).
R^2: coefficient of determination regarding the strength of the relationship between GDP and health spending
Durbin Watson Test: A test for serially correlated (or autocorrelated) residuals. Values less than 2 indicate positive autocorrelation, a common problem in time-series data. Values greater than 2 indicate negative autocorrelation.
Sources: see tables A1 and A2, calculations by IHS HealthEcon.

3.2 Individual countries influence worldwide growth in expenditure

However, a cross section analysis has a disadvantage because it assumes that all countries under investigations have a similar propensity to consume health care. In addition such an analysis cannot embrace real changes that took place within the period studied and/or structural breaks. When looking at the fixed effects measurement we see that the relative change in health spending amounted to 1.45 over time. However, the corresponding 95% confidence interval is quite wide and ranges from 0.7 to 2.22. Defining a 5% error probability we found that - adjusted for time trends - France, Germany and the Netherlands exhibit a significantly higher elasticity of health spending

than Austria. In those countries expenditure on health care either grew excessively or proportionally weaker in relation to the rise in GDP. If we include Switzerland and the USA into our analysis, the change accounts for 1.29, with France, Germany, the Netherlands and the United States having a significant effect on the global elasticity. Our results are generally in keeping with those obtained in other studies (see footnote 2). The measurement of a fixed effects model for the 21-country sample, however, lessens the stability of our parameters which may be due to different determinants not included into the relationship between growth in health spending and GDP in the various countries. This may have occurred primarily due to the variance of the relation in spending and income in the applicant countries (MOEL-4). Nevertheless, the elasticity is very likely to dependent on other factors which exert a certain kind of influence on health care expenditure[5].

With a low 0.78, the relative change in health spending was out of proportion in the Czech Republic, Hungary, Poland and Slovenia (MOEL-4) in 1996. This result corresponds to findings obtained in other studies, in which GDP did not correlate significantly with health spending and in which no reasonable results could be obtained for 1997. According to calculations by the World Bank, the elasticity of health spending lies between 0.8 and 1.08 in low-income countries (less than US$ 785 per capita) and amounts to 1.10 in "middle income countries" (between US$ 786 and US$ 9,635 per capita).[6] Apart from the fact that an updating of components included in the national accounts distorted the national statistics of transition countries, there might be striking disproportionalities between the development of the health care systems and the pace of overall economic growth which are inefficient on a macroeconomic basis. This trend is further reinforced by the fact that potential life years lost (before age 65) in Central and Eastern Europe are approximately 60% higher than the EU average.[7]

4 The role of the prices in a health care system

While the relative increase in health spending took place at a steady pace during the 1980s, it experienced a slow-down in the first half of the 90s. In addition to that the gap between the annual increase in GDP and the annual rise in health care expenditure widened. The problems with the measurement of price indices surely account for part of the increasing gap but inefficiencies, as well as excessive charges may also be held responsible for the change.

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[5] Blomqvist et al. suggested that all the calculations of elasticity overestimated its real level which was particularly due to country-specific factors that had not been taken into account but had nevertheless correlated with income. Their criticism, however, refers far more to the methods applied than to the contents. Blomqvist, A.G., Carter, R.A.L.: Is Health Care really a luxury? Journal of Health Economics 16 (1997), p. 207-229.

[6] The World Bank: *World Development Indicators 1998*, Washington D.C., p. 91.

[7] Hofmarcher, M. M: Is Public Health Between East and West? Analysis of Wealth, Health and Mortality in Austria, Central and Eastern European Countries, and Croatia Relative to the European Union, *Croatian Medical Journal* 39/3 (1998), p. 241-248.

4.1 Real per capita spending is up in nearly all the countries

It is rather striking that relative prices, as well as real spending per capita were growing strongly although differences in the set-up and financing of the various health care systems were persistent. Between 1981 and 1996 real spending per capita (at constant 1990 prices), experienced an average annual rise of 1.25% in Germany, 1.93% in the USA, 2.12% in Switzerland and 3.59% in France. In Austria the expenditure rose by 1% within the same period of time whereas real GDP increased by 1.73% a year. Throughout the 80s nominal, as well as real growth rates developed concurrently without major gaps between levels.

4.2 The real increases change as the gap between growth rates widens

In Austria, France, Germany, the Netherlands, Switzerland, Great Britain and the United States, the real rise in GDP per capita amounted to an average of 1.40% between 1981 and 1996 while the increase in real health spending per capita accounted for 1.92% within the same period of time. Table 2 shows that between 1983 and 1989 real per capita growth rates equaled 2.55% and 2.72%. From 1990 to 1996, however, they experienced a slow-down to 0.42 and 1.25%.

Within the periods considered, the increase in real health care spending per capita was diminishing by an average of more than 50% while real GDP per capita was suffering an even stronger decrease. This development led to a displacement effect, as well as to a widening in the gap between the two growth rates. Both real increase in income and real rise in spending were below average with the latter being a bit higher in all the countries except for the USA, Switzerland, and Austria between 1990 and 1996. Within our three periods of observation the Dutch health care system grew slightly less in relation to the other countries' systems.

Real per capita growth has been quite consistent during the 80s. However, in the first half of the 90s the tendency became heterogeneous while nominal spending per capita grew much stronger than GDP per capita. The sometimes significant differences between the institutional set-ups of the various health care systems might have become stronger in recent years. Massive structural changes as for example the introduction of so-called "quasi-markets" which have by now become a rather common feature in Finland, Italy, Spain, Sweden, Great Britain etc. might incite a medium-term price increase.

Table 2	***Growth rates of the gross national product per capita (GDP) and health spending per capita (HS)***											
	1981-1996				***1983-1989***				***1990-1996***			
	nominal		*real*		*nominal*		*real*		*nominal*		*real*	
	GDP	*HS*	*GDP*	*HS*	*GDP*	*HS*	*GDP*	*HS*	*GDP*	*HS*	*GDP*	*HS*
Austria	**5.19**	**6.14**	**1.73**	**1.00**	**5.46**	**6.98**	**2.21**	**2.20**	**4.18**	**5.86**	**1.05**	**0.42**
France	5.73	7.21	1.32	3.59	6.89	8.06	2.12	4.38	2.72	4.25	0.54	2.21
Germany	3.75	4.56	0.93	1.25	4.73	4.36	2.68	2.49	2.02*	4.83*	-1.21*	1.44*
Netherlands	3.56	3.94	1.77	1.71	3.25	3.14	2.40	1.91	3.51	3.97	1.51	1.46
Switzerland	3.66	5.93	0.38	2.12	5.46	6.82	2.25	3.62	1.15	3.65	-1.25	0.14
Great Britain	7.11	8.23	2.16	1.84	8.91	8.37	3.47	1.76	4.75	7.24	1.12	2.24
USA	4.89	7.77	1.51	1.93	6.38	8.76	2.74	2.69	3.59	5.50	1.14	0.86**
Average growth	4.84	6.25	1.40	1.92	5.87	6.64	2.55	2.72	3.13	5.04	0.42	1.25

*including Eastern Germany
**deflator of health spending estimated for 1995 and 1996

Sources: OECD Health Data 1998, Central Statistical Office, May, June 1998, IHS-HealthEcon – calculations for 1999.

Apart from ever increasing transaction costs regarding the drawing-up of price lists for medical services, contracts etc., the practical problem consists of the rather costly development of "real" bargaining prices. According to new findings[8] Great Britain and Sweden are particularly engaged in a reexamination of the concept of market liberalization in the field of health care with the emphasis being once again placed on the planning competence of the communities.[9]

4.3 Relative prices are up

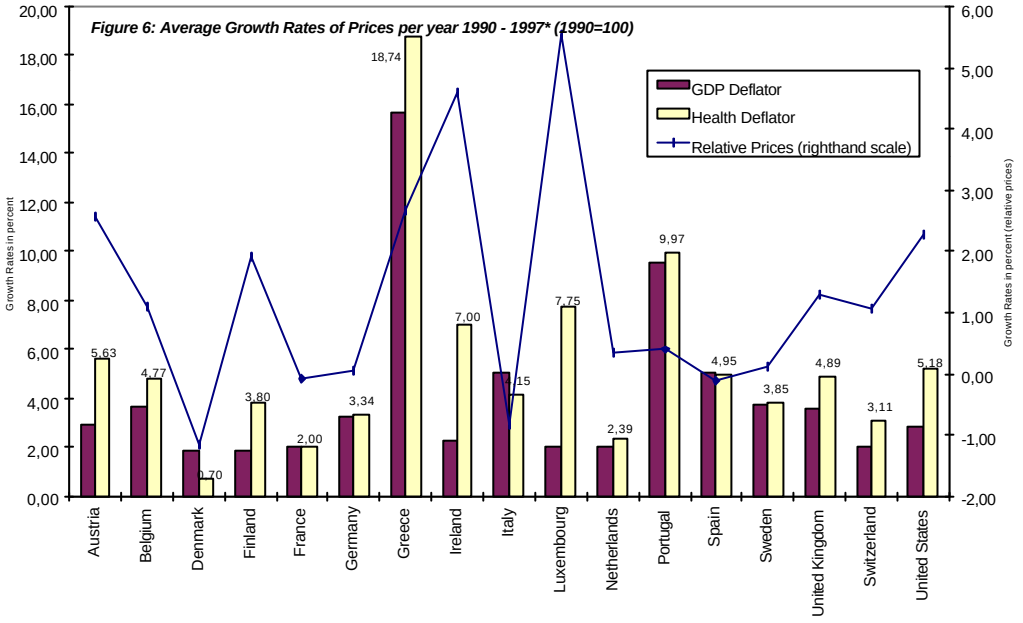
Figure 6 shows both the rate of price increase and the relative prices[10] then current in the EU member states, Switzerland and the USA. Except for Denmark, France, Germany, Italy and Spain the rise in prices for medical services are sometimes quite higher than the general price level in an economy, which holds also true for Austria. At constant 1990 prices, relative prices accounted for 2.58 in 1996 (right scale) which shows that the price increase in the health care sector was more than twice as high as the overall rise in prices. It is, however, difficult to assess whether prices are "too high"

[8] Interview with Victor Fuchs, Health Affairs 17/1 (1998), p. 91-96. Fuchs points out that the change in European health spending which unfolds much more slowly than in the USA has to be particularly attributed to supply side constraints (p. 95).

[9] Saltman, R. B., Figueras, J.: European Health Care Reform: Analysis of Current Strategies, WHO Regional Office for Europe, 1997, Kopenhagen.

[10] Relative prices indicate for example in how far a country's prices for health care services change in relation to other prices.

when we have no information about possible improvements in productivity.[11] The only thing we are able to derive from figure 5 is that in 12 out of 17 countries prices in the health sectors increased more rapidly than the general price level. There are various factors which surely contribute to a distortion or exaggeration of the extent of price increase on health care markets, as for example unascertained improvements in productivity[12], an excessive rise in the amount of goods used and services performed and problems to measure output and outcome, as well as their changes in quality over time. A special price index for health care systems might be used to ascertain improvements in productivity. Measurement problems concerning the indices which are persistent in any calculation of inflation rates explain part of the differences between the rates of price increase. Nevertheless, inefficiencies and "real" high prices may also be responsible for the development of prices in the health care sector.



*or last year available (1996: A, F, GER, ITA, LUX, NED, SPAIN, UK; 1995: FIN; 1994: IRE, USA; 1993: B, G, ITA, P, SWE)
Sources: OECD Health Data 1998, IHS HealthEcon calculations 1999

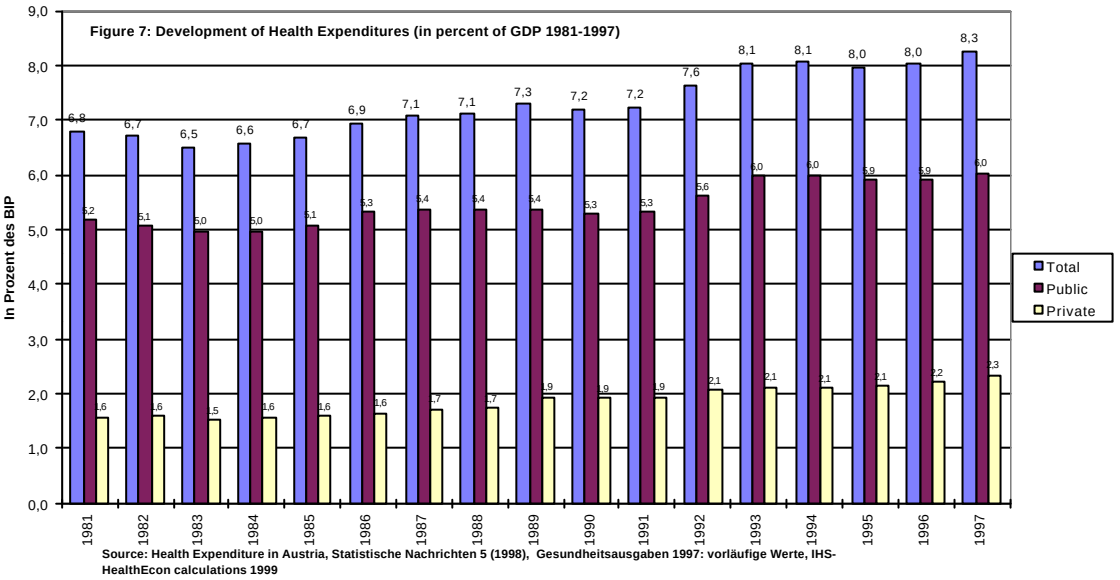
[11] If "potential life years lost" is regarded as a proxy indicator for improvements in productivity, Austria ranks first among all the other countries studied. (see also Hofmarcher, M.M.: Das Gesundheitswesen in Österreich, neue Trends, neue Fakten, *IHS Working Paper Nr. 19 (1997),* Vienna.

[12] Weisbrod (1991) and Newhouse (1992) describe the impact of technological changes and research on the spending trend in a health care system. Weisbrod, B.A: "The Health Care Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care and Cost Containment", *Journal of Economic Literature* 29 (1991), p. 523-52; Newhouse, J.P.: "Medical Care Costs: How much Welfare Loss?", *Journal of Economic Perspective* 6/3 (1992), p. 3-21.

5 Austria

5.1 Development in health spending and trends concerning the factors connected with it

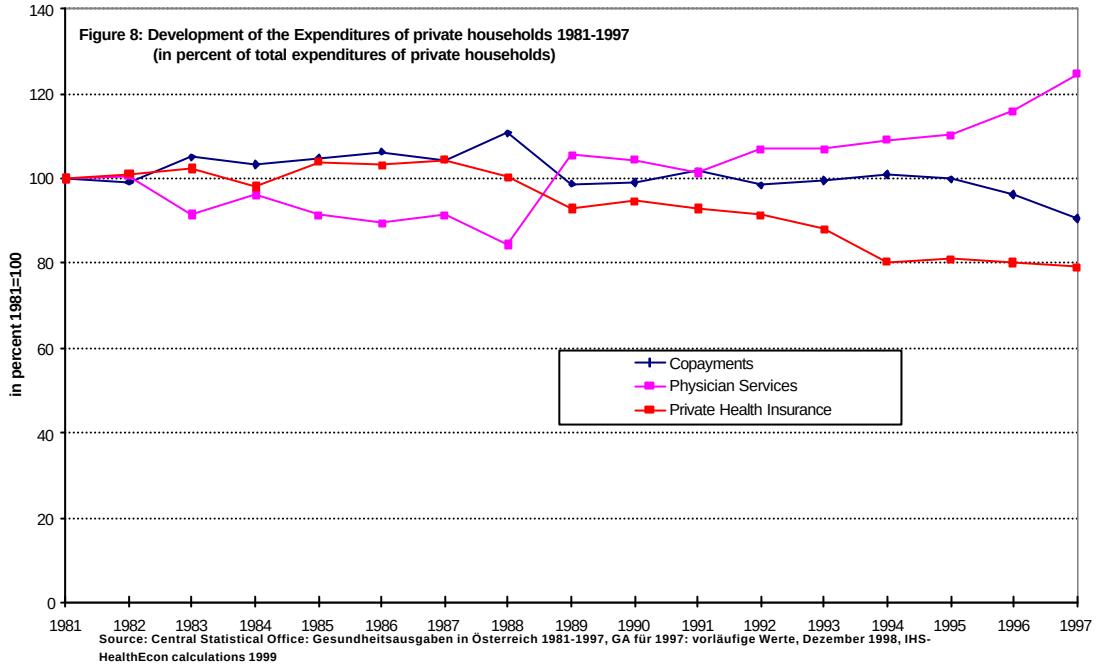
In Austria, the propensity to consume health services is high. Thus Austrians apparently consider health care to be a superior good. In real terms, however, health spending experienced a lower increase than GDP per capita . With regard to a rise in services performed, a variety of new goods and services available and an ever increasing life expectancy, this result clearly contradicts every experience made so far. However, significant measuring difficulties and overcharged prices in the private sector which in the view of ever rising consumption expenditure put a particular burden on private households might explain this development.



In 1997 overall health care expenditure[13] amounted to 8.3% of the GDP (Figure 7) and was thus 21.4% higher than in 1981. Public health spending increased by 16.4%. The private households' consumption expenditure, however experienced a rise of 48% between 1981 and 1997. Figure 8 shows that the private households' spending on physician services as share of their overall health spending increased by 25% within the period studied. Compared to public expenditure, private health care spending per capita rose significantly. Figure 9 documents the development of nominal spending per capita. From 1981 to 1997 private health spending more than tripled. At the end of our period of observation the increase in private health spending was 27% higher than public health care expenditure, which, however, had also more than doubled from 1981 to 1997. With

[13] Health care expenditures in Austria: OECD/VGR - concept; 1981 - 1997: Central Statistical Office, December 1998.

regard to constant 1990 prices[14] real private spending per capita rose by 70% (see Figure 10).



As demonstrated in table 3, the average rise of private nominal spending on physician services amounted to slightly more than 10% a year and was thus twice as high as the increase in both co-payments and expenditure on private health insurance. Within our total period of observation, the nominal health spending of private households rose by 8.03% with the growth rate amounting to 8.4% between 1982 and 1989 and to 7.7% from 1990 to 1997.

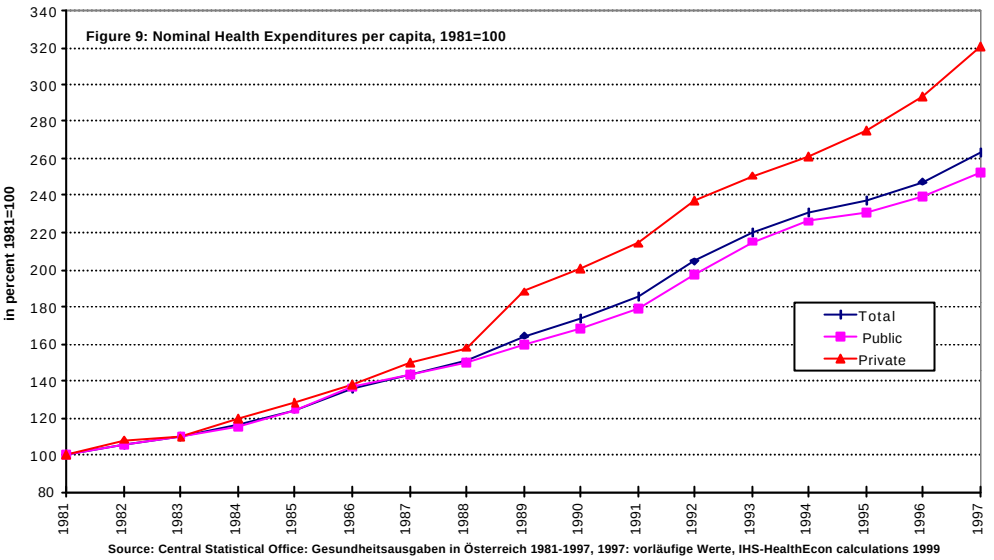
Between 1981 and 1997 public spending on health increased by 6.4% with overall public expenditures rising by 5.9% and overall health care expenditure increasing by 6.7% per year.

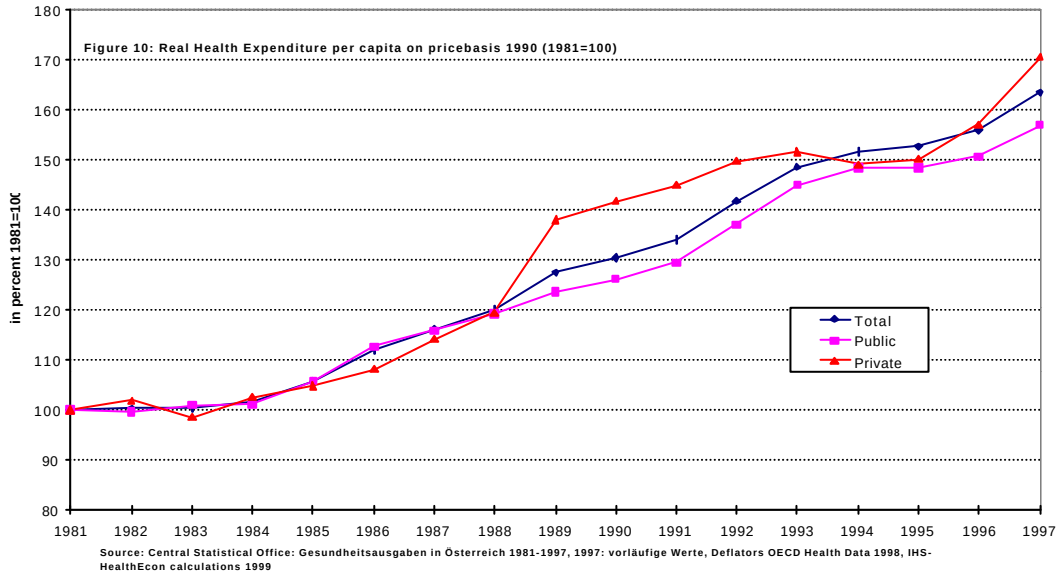
The slow-down in the rise of public spending was to a large extent due to a reinforced policy of budget consolidation which also affected social health insurance that finance at least 80% of overall public health expenditure. Effective tools for a deceleration of the increase in spending were reduced contracts with physician practices, efficient negotiations with pharmaceutical companies, as well as the budgeting of expenditure in certain fields of health care.

The sharp increase in private spending on physician services could be due to people's ever increasing demand for private doctors who practice but who have no contracts

[14] Both nominal and overall publich health spending were adjusted by means of the GDP deflator. Private spending, however, was adjusted with the help of the price index regarding private consumption of medical services which can be found in the OECD Health Data 1998.

with social insurance companies. In addition, since 1996 the reimbursement rate for patients who see a private physician decreased from 100% to 80% This analysis, however, is by no means clear on the question whether the Austrians' preference for private physicians arises from both a stronger health awareness and higher disposable income and /or whether the increased deductible is responsible for the dynamic change in health spending. It is highly probable, however, that a mixture of both trends accounts for the Austrian status-quo.





We are not able to give a detailed enumeration of reasons why private health spending rose so excessively, however, the data seem to indicate that the Austrians' increased care for their health manifested itself in a higher consumption of health care services. As already mentioned before, health is probably the population's supreme asset.

Table 3		**Nominal average growth rates**		
		1981-1997	1982-1989	1990-1997
Health spending	public	6.43	6.32	6.74
	private	8.03	8.42	7.70
Private households	Co-payments	7.36	8.33	6.35
	Physician services	9.35	9.17	10.48
	Private health insurance	6.44	7.11	4.94
Gross national product		5.42	5.39	4.79
Total public spending		5.86	5.5	5.65
Total health spending		6.70	6.67	6.85

Source: Central Statistical Office, December 1998, calculations by IHS-HealthEcon, 1999.

5.2 Elasticities of health spending in Austria between 1981 and 1997

Between 1981 and 1997 the relative increase in nominal health spending per capita ranged between 1.24 and 1.37 (95% confidence interval). Within the same period of time, private consumption expenditure experienced a proportional rise between 1.48 and 1.64 while public consumption spending grew between 1.18 and 1.31. (Table 4)[15].

Compared to relative public spending in the periods 1982 to1989 and 1990 to 1997 respectively, the elasticity of private spending was 24 percent and 11 percent higher. This higher elasticity of private households health spending confirms the observations in figure 9 and reinforces the evidence indicated in table 4.

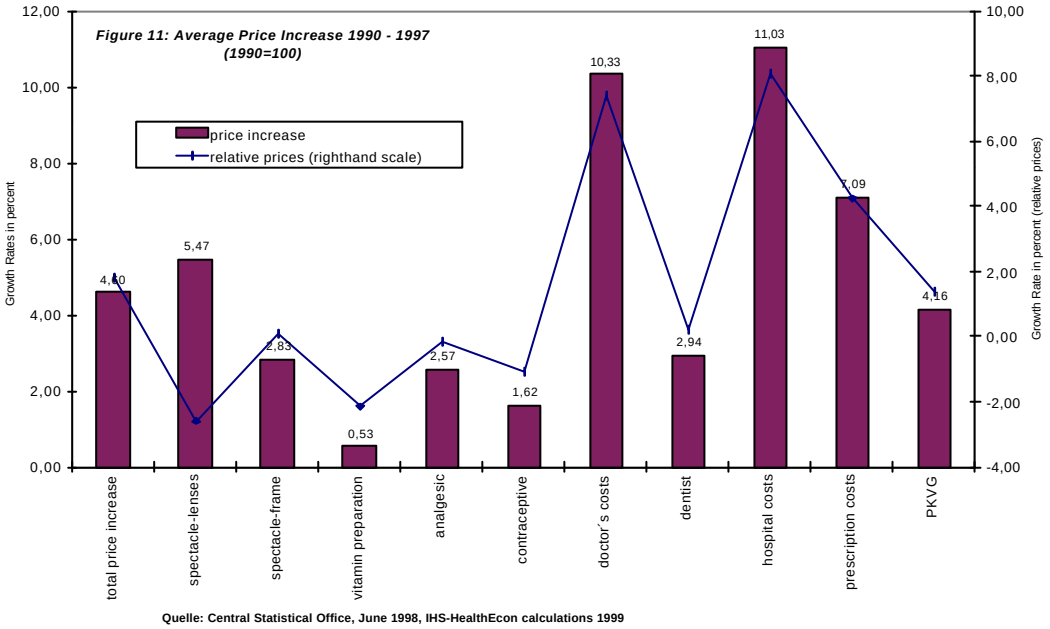
Table 4		**Income elasticities for health spending (HS) 1981-1997** [a]						
HS		coefficient GDP	confidence belt of 95% lower limit	confidence belt of 95% upper limit	constant term	confidence belt of 95% lower limit	confidence belt of 95% upper limit	coefficient of determination
total	1981-1997	1.30***	1.24	1.37	-2.76***	-3.09	-2.42	0.99
	1982-1989[b]	1.31***	1.16	1.46	-2.78***	-3.58	-1.98	0.98
	1990-1997[b]	1.50***	1.25	1.74	-3.80***	-5.13	-2.47	0.97
private	1981-1997	1.56***	1.48	1.64	-4.72***	-5.15	-4.29	0.99
	1982-1989[b]	1.57***	1.25	1.89	-4.78***	-6.44	-3.12	0.95
	1990-1997[b]	1.65***	1.45	1.84	-5.20***	-6.27	-4.12	0.98
public	1981-1997	1.25***	1.18	1.31	-2.58***	-2.94	-2.23	0.99
	1982-1989[b]	1.26***	1.12	1.40	-2.65***	-3.41	-1.90	0.99
	1990-1997[b]	1.49***	1.19	1.78	-3.89***	-5.48	-2.29	0.96

a) OLS-Regressions according to model 1;
b) in order to have symmetric periods to compare, seven year intervals were chosen.
*** $p \leq 0.001$

Source: Central Statistical Office, December 1998, IHS HealthEcon-calculations1999.

[15] By using the deflator for Austrian health care expenditure, we see that elasticity ranged between 0.63 and 0.86 (within a 95% confidence limit) which means that real health spending rose degressively in relation to real GDP per capita. With regard to an increase in services performed, a variety of new goods and services, as well as a steadily rising life expectancy, these results contradict every experience made so far. In an OECD cross-sectional study of 18 countries (1987) elasticity of real health spending amounted to 1.6%. OECD: *Financing and delivering Health Care* (1987), Paris.

Figure 11 shows the increase in the Austrian health care system's prices split up into the individual components of the index. The costs for hospital treatment and the fees of physicians rose strongest tightly followed by prescription charges and the costs for new glasses. It is generally assumed, however, that the rise in the Austrian health care system's prices is overestimated[16] since the individual factors of the price index only paint a rather selective picture of the real situation. The reason for this overestimation of prices is that the deflator reflects a trend in fees rather than market prices. It is furthermore assumed that certain measures of deregulation led to an increased competition in some fields of the health care system and thus provoked a decrease in prices in the 90s. From 1994 this development again stimulated the demand and in consequence also the consumption of health care services. It has to be taken into account, though, that even if the index is distorted and the fees do not represent market prices they may comprise monopoly rents which lead to an increase in prices and thus negatively affect welfare. Recent debates on the charges for dental crowns show that the recommended price which was finally agreed upon is way beyond an equally realistic but less profitable price.



Quelle: Central Statistical Office, June 1998, IHS-HealthEcon calculations 1999

[16] According to information disseminated by the Central Statistical Office on June 8, 1998, price trends in health care were particularly overestimated from 1981 to 1989. Between 1990 and 1996 the real effect probably dominated the price effect. The hypothesis thus is that prices sank and turnover rose within this period because more money was spent on health care services.

6 Conclusion: The health care system will expand further

The increase in the health care system‘s price indices[17] beyond the rise in the overall economic price indices is usually explained by the fact that the system’s productivity generally improves on a slower rate than overall economic productivity. This trend in turn is due to the fact that the health care system forms part of the service sector. If the service sector improves to a lesser extent than the economy as a whole, relative prices will rise over time. Consequently, expenditure will increase since the demand for health care services is rather insensitive to price changes – a fact that at least holds true for the main fields of health care that constitute more than 60% of overall health care spending. It is particularly difficult to ascertain improvements in productivity in the field of health care, because it is nearly impossible to measure the “final output“. It is, however, rather illogical to assume that productivity has not been improved in our health care system’s main branches, for example in acute care. It is far more likely, though hard to measureable, that productivity in health care has risen. If the quality of treatment is improved, it has only slight effects on the price indices. Therefore, it will be even more important in future to study factor flow and factor prices over a period of time, as well as to reasonably measure productivity with respect to output, i. e., to ascertain real effects of rapid product as well as process innovations in the health care sector.

[17] Apart from the general level of prices, real income per capita, the use of technological innovations and the percentage of people over 65, the density of physicians was identified as a determinant in a recent study. This new factor, however, correlated negatively with the increase in prices. In consequence, we might suppose that the density of physicians does not simulate demand, as has been generally assumed so far, but that increased supply leads to a decrease in prices charged for medical treatment. Cebula, R. J.: Determinants of the inflation rate of the health care CPI in the US, *Applied Economic Letters* 5 (1998), p. 47-49.

Table A1	**GROSS NATIONAL PRODUCT PER CAPITA**									**EU-15=100**								
	Purchasing power parities expressed in U.S. dollars																	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1990	1991	1992	1993	1994	1995	1996	1997	1998
Austria	**16712**	**17576**	**18581**	**19190**	**20036**	**20618**	**21965**	**22789**	**22262**	1998	**110**	**111**	**111**	**110**	**109**	**111**	**110**	**109**
Belgium	16668	17538	19011	19699	20577	21107	21986	22902	22452	110	110	113	114	113	111	111	110	110
Denmark	16557	17497	18096	19169	20419	21479	22669	23874	22679	109	110	108	111	112	113	114	115	111
Germany	14626	17070	18453	18558	19747	20466	21622	22385	21741	96	107	110	108	109	108	109	108	107
Finland	16203	15540	14868	15636	16330	17911	18634	19821	19814	107	97	89	91	90	94	94	96	97
France	17358	18244	19003	18684	19279	19909	20464	21290	20695	114	114	113	108	106	105	103	103	101
Greece	9187	9829	10680	11047	11700	12222	13143	13805	13608	60	62	64	64	64	64	66	67	67
Great Britain	15907	15758	16600	16881	17558	17865	19055	20139	19669	105	99	99	98	97	94	96	97	96
Ireland	11378	12149	13465	14255	15713	17198	18190	18875	20245	75	76	80	83	87	91	92	91	99
Italy	16257	17198	18099	17717	18682	19460	20236	20914	20069	107	108	108	103	103	102	102	101	98
Luxemburg	22809	24382	26523	28176	30178	31206	31677	33089	32679	150	153	158	163	166	164	160	160	160
Netherlands	15926	16517	17424	17854	18838	19852	20481	21450	20964	105	104	104	104	104	105	103	103	103
Portugal	9372	10167	10889	11431	12042	12457	12963	13672	14095	62	64	65	66	66	66	65	66	69
Sweden	17011	16898	16908	16824	17543	18727	19419	20150	19528	112	106	101	98	97	99	98	97	96
Spain	11856	12873	13287	13440	13743	14318	15162	15800	15593	78	81	79	78	76	75	76	76	76
EU-15§	15188	15949	16792	17237	18159	18986	19844	20730	20406	100	100	100	100	100	100	100	100	100
EU-EURO§	15379	16296	17237	17695	18651	19500	20307	21181	20964	101	102	103	103	103	103	102	102	103
Switzerland	21223	21770	22829	23498	24173	24992	24608	25088	*	140	136	136	136	133	132	124	121	*
USA	22224	22605	23600	24551	25764	26711	27821	29195	*	146	142	141	142	142	141	140	141	*
Estonia	n.v.	8819	7283	6750	6697	7057	7407	8251	*	*	55	43	39	37	37	37	40	*
Poland	5089	4718	4828	5000	5242	5565	5866	6271	*	34	30	29	29	29	29	30	30	*
Slovenia	11878	10896	10333	10500	11087	11704	12308	12776	*	78	68	62	61	61	62	62	62	*
Czech Republic	10027	8825	8268	8200	8414	8759	9184	9193	*	66	55	49	48	46	46	46	44	*
Hungary	7471	7224	6375	6200	6400	6558	6789	7088	*	49	45	38	36	35	35	34	34	*
MOEL-5§	8616	8096	7417	7330	7568	7929	8311	8716	*	57	51	44	43	42	42	42	42	*

§ unweighed average.

Sources: *OECD-Health Data 1998, data for central and eastern european countries (MOEL-5): Nationale Statistics, WHO Health for All Database 1999, GDP 1998: Eurostat:*

table agc01u16 ESVG-Aggregate zu jeweiligen Preisen - in $PPP, IHS-HealthEcon calculations 1999.

Table A2	**OVERALL HEALTH SPENDING PER CAPITA**								**EU-15=100**							
	Purchasing power parities expressed in U.S. dollars															
	1990	1991	1992	1993	1994	1995	1996	1997	1990	1991	1992	1993	1994	1995	1996	1997
Austria	**1204**	**1272**	**1409**	**1529**	**1594**	**1641**	**1748**	**1793**	**106**	**103**	**105**	**110**	**110**	**109**	**110**	**109**
Belgium	1248	1382	1516	1600	1656	1664	1708	1747	110	112	113	115	114	110	108	106
Denmark	1364	1429	1486	1608	1677	1708	1802	1848	120	115	111	116	116	113	114	112
Germany	1279	1603	1834	1847	1982	2128	2278	2339	112	129	137	133	137	141	144	142
Finland	1292	1416	1384	1310	1290	1370	1380	1447	113	114	103	94	89	91	87	88
France	1539	1656	1783	1834	1874	1971	1983	2103	135	134	133	132	130	131	125	128
Greece	386	415	476	549	636	703	888	974	34	33	35	39	44	47	56	59
Great Britain	955	1021	1151	1165	1213	1234	1317	1347	84	82	86	84	84	82	83	82
Ireland	759	855	982	1047	1124	1204	1276	1324	67	69	73	75	78	80	81	80
Italy	1321	1449	1540	1515	1562	1503	1584	1589	116	117	115	109	108	100	100	97
Luxemburg	1495	1575	1743	1891	1956	2077	2139	2340	131	127	130	136	135	138	135	142
Netherlands	1326	1417	1536	1599	1652	1743	1766	1825	116	114	115	115	114	116	112	111
Portugal	614	731	806	875	941	1025	1071	1125	54	59	60	63	65	68	68	68
Sweden	1492	1462	1496	1504	1533	1590	1675	1728	131	118	112	108	106	106	106	105
Spain	815	900	974	1010	1015	1042	1115	1168	72	73	73	73	70	69	70	71
EU-15§	1139	1239	1341	1392	1447	1507	1582	1646	100	100	100	100	100	100	100	100
EU-EURO§	1172	1296	1410	1460	1513	1579	1641	1709	103	105	105	105	105	105	104	104
Switzerland	1760	1937	2115	2197	2288	2403	2499	2547	154	156	158	158	158	159	158	155
USA	2799	3035	3276	3468	3628	3767	3898	4090	246	245	244	249	251	250	246	248
Estonia	538	480	482	675	735	749	687+	798+	47	39	36	48	51	50	43	48
Poland	224+	216	234	229	219	225+	371	323+	20	17	17	16	15	15	23	20
Slovenia	311	311	449	654	743	856+	976+	1097+	27	25	33	47	51	57	62	67
Czech Republic	538	480	482	675	735	749	904	922+	47	39	36	48	51	50	57	56
Hungary	322+	391	424	406	459	562	602	626+	28	32	32	29	32	37	38	38
MOEL-5§	386+	376	414	528	578	628+	713+	753+	34	30	31	38	40	42	45	46

§ unweighed average. Estimates achieved by extrapolation.

Sources: *OECD-Health Data 1998, WHO Health for All Database 1999, yearbook of the polish statistical office 1997, table 7 (697) p. 505, yearbook of the polish statistical office 1997, table 24-15 p. 585, IHS-HealthEcon calculations 1999.*

Table A3	**Public health spending**								**EU-15=100**							
	as percentage share in overall health spending															
	1990	1991	1992	1993	1994	1995	1996	1997	1990	1991	1992	1993	1994	1995	1996	1997
Austria	**73.5**	**73.4**	**73.3**	**73.9**	**74.1**	**73.3**	**72.0**	**72.0**	**92**	**92**	**92**	**93**	**94**	**93**	**94**	**94**
Belgium	88.9	88.1	88.9	88.9	87.9	87.8	87.7	87.6	111	111	112	112	112	112	114	115
Denmark	86.1	86.6	86.7	86.3	86.6	86.1	65.2	65.0	108	109	109	109	110	110	85	85
Germany	76.2	78.2	78.5	77.6	77.6	78.2	78.3	77.4	95	98	99	98	99	100	102	101
Finland	80.9	81.1	79.6	76.3	74.8	74.7	78.4	77.0	101	102	100	97	95	95	102	101
France	74.5	74.7	74.6	74.2	78.4	80.6	80.7	78.4	93	94	94	94	100	103	105	102
Greece	82.3	80.2	76.1	76.2	76.2	75.8	77.5	74.8	103	101	96	96	97	97	101	98
Great Britain	84.1	83.7	84.5	84.8	84.1	84.4	84.5	84.5	105	105	107	107	107	108	110	110
Ireland	72.9	74.4	75.1	75.3	75.2	74.7	74.2	75.0	91	93	95	95	95	95	96	98
Italy	78.1	78.4	76.3	73.1	70.6	69.3	69.8	69.9	98	98	96	92	90	88	91	91
Luxemburg	93.1	93.0	92.8	92.9	91.8	92.4	92.6	91.8	117	117	117	118	117	118	120	120
Netherlands	72.7	74.1	77.4	78.3	77.5	76.7	72.1	72.0	91	93	98	99	98	98	94	94
Portugal	65.5	62.8	59.6	63.0	63.4	60.5	59.8	60.0	82	79	75	80	80	77	78	78
Sweden	89.9	88.2	87.2	85.7	84.6	83.4	83.0	83.3	113	111	110	108	107	106	108	109
Spain	78.7	78.7	78.7	79.1	78.7	78.7	78.7	78.7	99	99	99	100	100	100	102	103
EU-15§	79.8	79.7	79.3	79.0	78.8	78.4	77.0	76.5	100	100	100	100	100	100	100	100
EU-EURO§	77.7	77.9	77.7	77.5	77.3	77.0	76.8	76.3								
Switzerland	68.4	68.6	70.1	71.8	72.1	72.3	70.0	69.9	86	86	88	91	92	92	91	91
USA	40.7	41.9	42.9	43.5	44.8	45.9	46.7	46.7	51	53	54	55	57	59	61	61
Estonia	*	*	*	*	*	*	88.0	87.0	*	*	*	*	*	*	114	114
Poland	100.0	94.1	93.6	93.5	93.5	93.1	92.7	93.0	125	118	118	118	119	119	120	122
Slovenia	100.0	100.0	100.0	93.0	91.0	89.7	89.1	88.3	125	125	126	118	116	114	116	115
Czech Republic	96.2	96.7	95.4	94.8	93.9	92.6	92.4	92.0	121	121	120	120	119	118	120	120
Hungary	100.0	100.0	91.9	71.1	71.7	69.8	69.3	69.1	125	125	116	90	91	89	90	90

§ unweighed average,

Sources: *WHO Health for All Database 1999, OECD-Health Data 1998, calculations by IHS-HealthEcon, 1999.*

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