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FEDERAL MINISTRY OF
HEALTH AND WOMEN



Health as a Growth Factor *A Comparative Analysis*

Reiner Buchegger
Klaus Stöger

Institute for Health Systems Research
at the University of Linz

September 2003



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FOREWORD

Almost all countries of the European Union have, one way or another, formulated something in their national constitution on the right of citizens to health care. Consequently, governments have an obligation to act. They cannot leave supply and demand regarding health care completely to the market. And, in fact, they don't. On the contrary, governments interfere heavily in the process of financing, provision and organization of health care. They have to, be it only for the fact that equal access to health care is seen as an expression of solidarity among European citizens.

In trying to maintain that solidarity, governments prove to be very keen on cost containment. After a period of about fifteen years of open end financing in many countries of the European Union, almost all governments started to introduce systems of budgeting in the beginning of the eighties of past century, followed by successive budget cuttings. The problem with budgeting, though a very effective financial instrument, is that one cannot use it endlessly. If one wants to maintain high quality health care, there comes a moment that one has to try something else, if one wants further cost containment. In this respect, one can think of organizational measures, shifts in the power balance between providers, insurers and consumers, increasing personal contributions or reductions in the collective package to be covered. Besides, one can make use of other financial instruments. The introduction of systems of diagnostic related groups at the moment all over Europe is a popular example in this respect.

The problem with health care, however, is that it is subject to immanent dynamics. These dynamics make it legitimate to define health care as a complex process of continuous innovation, i.e. of constantly implementing new combinations of science, technology, organization, economics, politics, philosophy, culture, opinions and fashion. Controlling such a process will stay extremely difficult. This is the more true because science and technology are very important boosters for the developments in health care. Consequently, it will become increasingly difficult to combine the results of these boosters with the principle of solidarity. Here is where the market comes in. But before governments give room to the market, they would do wise to consider an alternative way, instead of approaching health care only as an item of public spending. Here, this pilot study of Austrian scientists is of help. Comparing France and Austria, they consider health care from a macro-economic perspective, asking what a health care system contributes to a sound society. Governments, or, even better, the European Commission, would do wise to take notice of the pilot's outcomes, giving the researchers the opportunity to broaden the scope of this study to the complete European Union.

Prof. Dr. Winfried de Gooijer
President of the Sub-Committee on Economics and Planning of the Standing
Committee of the Hospitals of the European Union (HOPE)

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List of abbreviations

A	Austria
BMSG	Federal Ministry for Social Security and Generations
EHFG	European Health Forum Gastein
ESA	European System of Integrated Economic Accounts
EU	European Union
F	France
FTE	Full Time Equivalents
GDP	Gross Domestic Product
H	Hospitals
HI	Health Industry (Pharmaceutical industry, Medical–technical industry, Medical Trade)
HOPE	Standing Committee of the Hospitals of the European Union
HP	Healthcare Providers (Hospitals and practitioners, general and specialists)
IPG	‘Institut für Pflege– und Gesundheitssystemforschung’ (Institute for Healthcare and Health–related Systemic Research)
MA	Macroeconomic Accounting
PV	Production Value
SCEP	Sub–Committee on Economics and Planning of HOPE
VA	Value Added

1. INTRODUCTION

1.1. Origin and objectives of the study

Between 1999 and 2001, the ‘Bundesministerium für Soziale Sicherheit und Generationen (BMSG)’ (Federal Ministry for Social Security and Generations), formerly : ‘Bundesministerium für Arbeit, Gesundheit und Soziales’ (Federal Ministry of Labour, Health and Social Affairs) commissioned a group of researchers at the ‘Institut für Pflege– und Gesundheitssystemforschung (IPG)’ (Institute for Health Systems Research) and the ‘Institut für Volkswirtschaftslehre der Universität Linz’ (Department of Economics) at the University of Linz to analyse the Austrian public health system from a macroeconomic point of view. The result of this research were the two studies on ‘Gesundheit als Wachstumsfaktor’ (Health as a Growth Factor) und ‘Gesundheitsökonomische Strukturen und Verflechtungen im österreichischen Gesundheitswesen’ (Health Economics Structures and Interrelations in the Austrian Health System¹), in which an attempt was made to provide as detailed a picture as possible of the contribution of the various service providers and producers within the public health sector towards developing gross domestic product and its components. These investigations were presented to the public and interested parties in Austria and abroad.²

Although the developments of the time series for Austria over a period of more than one and a half decades in themselves already produced several interesting results, the desire arose for further information to be obtained from a comparison with similar investigations in other (primarily) European countries. In search of potential partners for a European comparison of this kind, the ‘Sub–Committee on Economics and Planning (SCEP)’ of the ‘Standing Committee of the Hospitals of the European Union (HOPE)’ was an obvious choice.

A first meeting with potential partners from Germany and the Netherlands took place on 3 November 2000 in Vienna. The agenda for this meeting and a summary account of the results (the latter in English) are contained in Annex 1 to this Report.

An initial task was to acquaint the institutions potentially willing to co-operate with the model used in greater detail. For this purpose, the methodology used – generalised and compiled in English – was sent to potential co-operating partners on the basis of an ad-

1 Brunner et al. (1999) and Brunner et al. (2001)

2 Among others, in a meeting of the Platform Health Economics in Vienna on 12.12.2000, in the meeting Health Economics of the ‚BMSG’ in Vienna on 14.11.2001, in a meeting of the Sub–Committee on Economics and Planning (SCEP) within the scope of the Standing Committee of the Hospitals of the European Union (HOPE) in Bad Hofgastein on 12.1.2002, in the Working Group Health Economics of the ‚BMSG’ in Vienna on 14.2.2002, at the Annual General Meeting of HOPE in Dublin on 27.5.2002 and at the European Health Forum Gastein (EHFG) on 27.9.2002.

dress list provided by the 'BMSG'. This version of the 'Methodological Notes on the Structural Analysis of the Austrian Health Sector, an Overview' is part of Annex 2 in this Report.

As a further impulse to co-operate, the model and the core results of the Austrian investigations were presented in a paper read in an Austrian meeting of the 'Sub-Committee on Economics and Planning' (SCEP) of the 'Standing Committee of the Hospitals of the European Union (HOPE)' on 12 January 2002 in Bad Hofgastein. The transparencies of this paper 'Structural Analysis of the Austrian Health Sector – Health as a Growth Factor' are enclosed with this Report as Annex 3.

Due to staff changes and other effects, the Member States originally participating, namely Germany and the Netherlands, are now represented only indirectly. Although the comments by de Gooijer in 1999 on the situation of the Dutch public health system were an important contribution to our work, they tended to form more of a framework for necessary analysis than to produce results that would permit a detailed illustration and exhaustive comparisons with other member states of the EU.

While retaining the original design, the detailed analysis of the countries originally earmarked (Germany and the Netherlands) had to be changed (and restricted) to France as a result of our searches, since following detailed investigations, no other largely comparable analyses could be found at national level. In addition, however, ad-hoc analyses were presented of several member states (Germany, The Netherlands, the United Kingdom) and regions (North Rhine–Westphalia, Munich) and – as far as possible – related to the Austrian results.

The following questions were retained as central criteria:

- What differences can be found between the structure of the Austrian public health system and those of the other states or regions?
- What did these differences look like sometime ago, e.g. during the eighties, what form did they take in the nineties?
- Do structural developments in the various countries/regions tend to diverge or converge?
- What general statements concerning the public health sector can be derived from these comparative macroeconomic presentations?
- What final conclusions arise for the labour market in particular? ³

³ By stressing the effects of employment of an expanding health sector we want to contribute towards relieving this area of its image as a pure cost factor.

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- What data or further analyses would be necessary or desirable, i.e. what useful findings would further research be expected to provide on a broader basis?

Consequently, the work presented at this stage is to be regarded also as a pilot study in the European context.

Approaching the health sector from the viewpoint of macroeconomic structures expanded by components of demand – and, in context, undoubtedly also questions of financing from a macroeconomic aspect – should contribute to improved decision-making for measures of health policy.

1.2. Structure of the investigation

Following a prospective overview of the economic importance of the public health system on the basis of the labour market in Chapter 2 below, Chapter 3 provides a detailed comparison between France and Austria as a central element in the study. The investigations regarding France are in large parts constructed methodically similar to our work for Austria and are therefore largely comparable as to content.

Chapter 4 contains summaries, conclusions and perspectives.

2. THE ECONOMIC IMPORTANCE OF THE HEALTH SECTOR AS EXEMPLIFIED BY THE LABOUR MARKET: A EUROPEAN PERSPECTIVE

While to some extent impressionistic, the following statements nonetheless outline the economic importance of the health sector in Europe in orders of magnitude.

DE GOOIJER 1999, for example, refers to a share of persons employed in hospitals in the total employed population in the Netherlands of approx. 6% (1997). For the health sector as a whole, he quotes a figure of 13 percent (or 800,000) of all employed persons. His conservative extrapolation therefore produces a total employment in the Health sector in the Member States of the European Union in a bandwidth of 10 to 20 million. This points already to two aspects. Firstly, the economic importance of the sector – even if we start with the lower figure – measured here against the labour market, and secondly, the need for research into the economic dimension of this important sector in order to attain the desirable precision with regard to a bandwidth of this size.

The research report by the MINISTRY FOR WOMEN, YOUNG PERSONS, FAMILY AND HEALTH OF THE LAND OF NORTH RHINE–WESTPHALIA in 2000 contains comments as a case study on ‘Development of employment in the Dutch Health sector’. According to this, some 810,000 persons were employed in the public health system in 1998, including those in long–term care. This tallies with the upper limit of 13% referred to in the preceding paragraph, which excludes ‘indirect employment’ (see following paragraph).

According to HILBERT, 1999, over 4 million persons were employed in the public health system in the Federal Republic of Germany in 1995, corresponding to a share of aggregate employment in excess of 11%. If we take the part–time employed into account (some 21% of those employed in the public health system) and marginal part–time workers (approx. 4%), this still produces close to 3.5 million employed persons in full–time equivalents and consequently just under 11% of aggregate employment measured in FTE’s (Full Time Equivalents). For subsequent comparisons, it must be noted above all that only persons so–called directly employed in the public health system are concerned here, ignoring employment resulting from economic interrelations of the Health sector with the other economic sectors, the so–called indirect employment.

With a similar definition, Bocognano & Raffy–Pihan (1995) calculate (direct) employment in the French health sector in 1992 at approx. 1.66 million persons, corresponding to a share of aggregate employment of just under 7.5%. If the associated

staff of public administrations and the insurance industry (public and private) are included as well – just short of a further 180,000 – this produces some 1.83 million persons employed in the public health system or 8.3% of aggregate employment. Their definition of the public health system excludes those concerned with long–term care and assistance.

For Austria, Brunner et al. 2001 calculated approx. 314,000 persons employed (directly) in healthcare in 1998: including the employment ‘evoked’ by the health sector through the procurement of intermediate input from other sectors of the economy (indirect employment), they obtain a total figure of approx. 384,000 persons directly and indirectly employed, corresponding to a share in aggregate employment of 9.7%. The definition of the health sector used for this purpose also includes long–term care and assistance, which means that these results cannot, for example, be directly compared with those for France.

In his analysis of Austria in 1991 Kratena 1997 indicates barely 250,000 directly employed in healthcare and long–term care, which corresponds to a share of aggregate employment of 6.8%, a value perfectly compatible with the findings by Brunner et al. 2001 (direct share in employment for 1998: 7.9%), since employment in Austria also rose far more sharply in the health sector than in the economy as a whole during the nineties.

At regional level, the study by the MINISTRY FOR WOMEN, YOUNG PEOPLE, FAMILY AND HEALTH OF THE LAND OF NORTH RHINE–WESTPHALIA for 2000 already mentioned shows employment for 1998 in health sector institutions of nearly 1 million persons (precisely 957,000).⁴ This figure includes not only long–term care and the health industry but also the health administration and training centres and research institutions as well as e.g. the ‘wellness’ area, health tourism and the like. On the other hand, there is no comprehensive inclusion of the effects on other sectors of the economy, as in the Austrian analyses.

For the City of Munich Neubauer & Lindl 1998 calculated almost 105,000 persons directly employed in the public health system, corresponding to a share of total persons employed in Munich of 13.6%. Employment induced by the health sector in other branches of economic activity – corresponding to the concept of indirect employ-

⁴ The study does not indicate the share of employment in the public health system to total employment in North Rhine–Westphalia. It merely states ‘The health economy is one of the largest sectors in the State’ (p.1). A comparison can be made with employment subject to social security in the Land of North Rhine–Westphalia of just under 5.8 million (1998) (p. 209 of the study quoted); this would produce a (direct) employment share for the Public health system of approx. 16.5%.

ment – is set at 4.9 %, so that the public health system would be responsible for a total of 18.5 % of persons employed in Munich (directly and indirectly).

What can be concluded from these impressionist comments regarding the effects of employment as an indicator of the economic importance of the health sector by European comparisons?

- The Health sector is an important economic factor at all levels – local, regional, member states and (presumably) for that reason also at European Union level – its significance is rising in (virtually) all analyses.
- However, the significant shares of employment differ widely between the various studies, they fluctuate according to definitions from 6 % (only hospitals in the Netherlands) and 18.5 % (direct and indirect) employment in Munich.
- For various reasons, comparisons between developments over of time, but also at particular periods, are only possible to a limited extent. Differences in the definitions of the health sector (only the hospitals area, only healthcare providers, healthcare providers plus the health industry, inclusion of the long–term care sector, allowing for ‘wellness’ and health tourism, and inclusion of medical training and research, to mention only the more important differences in forming the definitions), including only direct or also indirect employment, the restriction to dependent employment or self–employed persons as well, different years as a basis for calculation, and the like.

Because of the importance of the health sector, on the one hand, and the heterogeneity of investigations, on the other, deeper analyses with largely corresponding postulates as to definitions and methods, going beyond the labour market as well, are urgently indicated at European level. The following analysis may serve as an example for this.⁵

5 The paper by Göppfahrt & Milbrandt 1997 provides some figures on employment, production values, intermediate consumption and value added in Germany. They were not included in the investigation since they were only marginally comparable with the analyses for France and Austria. Information is available only for one year (1994). The date for this purpose originate from 1991 to 1994 and were in some cases obtained by analogy calculations based in 1975. Employment figures fluctuate between 1.96 and 4.2 million. We have therefore reproduced them in summary form in Annex 6 only as an elucidation.

3. A DETAILED COMPARISON OF THE HEALTH SECTOR BETWEEN FRANCE AND AUSTRIA FROM A MACROECONOMIC POINT OF VIEW

3.1. Preamble

Following comprehensive research and a detailed search of the literature, we found investigations that are comparable with the Austrian studies only for France. The papers received and the references⁶ include the work of Bocognano & Raffy–Pihan 1995, 1997, 1998 and that of Auray & Duru 1995, which are largely comparable with the Austrian investigations as to methodology, content and the period investigated. As may be expected, there are parts that include a greater measure of detail compared with our studies and other parts that are, in turn, less detailed.

- The question posed, which is not concerned with computing health expenditure but with an analysis of the public health system as part of the macroeconomic output, is identical with the Austrian analyses.
- The period investigated, 1984–1993, lies within the period of the Austrian studies and therefore permits comparisons between developments in this sector in both countries.
- The definition of the health sector is also largely in accordance with the Austrian studies, i.e. including the relevant industries (pharmaceuticals, medical devices, and trade).
- Unlike the Austrian definition of the health sector, the French investigations do not include the area of long–term care and assistance.

The French results are shown in Section 3.2. below, followed by the Austrian results in Section 3.3., and a comparative review in Section 3.4..

3.2. The development of the French health sector in the period 1984–1993

The questions posed for the French analyses were the following:

- What contribution does the health sector make to the national product?

6 At this point I should like to express my particular thanks to Pascal Garel, Secretary-General of HOPE for references and support received.

- How has value added developed in the course of time?
- Is the development of value added accompanied by a corresponding development of employment?
- Have there been advances in productivity?

The first three questions correspond to the remit of the Austrian analyses. The last question was not examined as part of the macroeconomic studies for Austria.

3.2.1. Definition and methodology

The health sector in the French studies consisted of the following areas:

- Hospitals, public and private
- Practitioners, general and specialists (such as out-patient clinics, sanatoriums)
- The pharmaceutical industry
- The medical devices industry
- The medical trade

Because of the lack of detail in the statistical source material, there were difficulties in delimiting private hospitals and the practitioners, general and specialists.⁷ The medical trade covers only wholesaling since medical retailing could not be separated from other commodities included here, such as cosmetics, perfumery and the like. An exception was the distribution of spectacles, which is included in full.

The introduction of a new scheme for classifying economic activities in 1993 (NAF 93 instead of NAP 73) caused gaps in the data series. These had to be accounted for by special processes.⁸

3.2.2. The production accounts for the French health sector: Production Values, Intermediate Consumption, Value Added

The production accounts for the French health sector for 1984–1993 are shown in Annex 5. Table 3.1. provides a summary overview of the trend measured against the average annual growth figures. Growth in GDP of an annual average of 5.8 % (nominal, i.e. at current prices not adjusted for inflation) may be taken as a reference point for these growth rates during this period.

⁷ It is worth noting that these and similar difficulties also existed in the Austrian investigations; the difficulties and differences are dealt with in Section 3.4.

⁸ Part of the series could be extrapolated without assumptions and special calculations, namely where equivalence could be established between new and old classifications.

Table 3.1: Average annual growth rates (nominal) 1984–1993, in %

	Production Value	Value Added
Hospitals	6.7	6.7
thereof: private hospitals	9.1	8.3
public hospitals	6.3	6.4
Practitioners, general and specialists	7.0	6.8
Pharmaceutical industry	9.2	9.8
Medical devices industry	8.4	7.3
Medical-related trade	8.4	8.3
Aggregate public health system	7.4	7.1

Source: see Annex 5

Each partial area, and therefore also the public health sector, clearly shows a stronger growth than GDP. As a result the share of the health sector in GDP also increased from 5.5 % in 1984 to 6.2 % in 1993.

As a rule, the production value (PV) and the value added (VA) grow in a similar manner. Solely in private hospitals and in the medical-devices industry the value added (VA) increases more slowly than the (PV); in the pharmaceutical industry this relation is reversed. If the value added (VA) increases more slowly than the production value, there is a stronger interrelationship with other economic sectors (e.g. lesser vertical integration, more outsourcing). Growth rates of the pharmaceutical industry and private hospitals (the latter measured by the PV) clearly show stronger growth rates, while the services of public hospitals and of practitioners, general and specialists, have grown below average compared with the aggregate public health system during this period.

These developments also cause changes in the shares of individual health producers in the total output, as is shown in Table 3.2.

Table 3.2: Shares of individual healthcare producers in the aggregate public health system, measured by Production Value and by Value Added, in %

	Production Value		Value Added	
	1984	1993	1984	1993
Hospitals	50.9	48.2	55.7	53.8
thereof: private hospitals	7.8	9.0	8.3	9.2
public hospitals	43.1	39.3	47.4	44.6
Practitioners, general and specialists	24.0	23.3	26.6	26.0
Pharmaceutical industry	15.1	17.6	6.7	8.4
Medical devices industry	2.2	2.4	1.8	1.8
Medical-related trade	7.7	8.5	9.2	10.1
Aggregate public health system	100	100	100	100

Source: see Annex 5

As a general rule, it may be stated that the shares of healthcare providers are higher measured by value added than expressed in production values. This fact reflects the lower intensity of intermediate input or the higher value added of healthcare providers when compared to the health industry.

Shifts between the individual healthcare providers and the industry during this period of 10 years are similar when measured in both values (i.e. VA and PV) but at the same time notable: Share losers are practitioners, general and specialists, and the hospital area as a whole; here the private hospitals gain shares, while the public institutions clearly lose shares. Relative winners are the pharmaceutical industry and the medical trade.

The last overview in this chapter points out the extent of interrelations between subdivisions of the public health system and the remaining industry. The shares of intermediate consumption in production value are a measure for this statement. Their extent and development are summarised in Table 3.3.

Table 3.3: Percentage of the shares of intermediate consumption in the Production Value for selected years

	1984	1989	1993
Hospitals	26.4	26.6	26.5
thereof: private hospitals	28.4	31.9	32.6
public hospitals	26.0	25.5	25.1
Practitioners, general and specialists	25.5	25.8	26.6
Pharmaceutical industry	70.1	69.7	68.5
Medical devices industry	45.5	49.6	50.2
Medical-related trade	20.2	19.9	21.1
Aggregate public health system	32.7	33.7	34.0

Source: see Annex 5

As anticipated, the share of intermediate input in production value is essentially higher in the health industry than in the domains of healthcare service providers and in medical trade (which is also a provider of services).

Over time the hospitals collectively indicate a proportionately constant intermediate consumption, consisting of a clear rise of this share in the domain of private hospitals and a decline in the domain of public hospitals. The higher share of intermediate consumption in the domain of private hospitals – which has risen in this decade – points to a greater (and growing) share of aggregate services being subcontracted (outsourcing).⁹

While the pharmaceutical industry presents a slightly retrograde share of intermediate input, the latter has clearly increased in the medical devices industry. The relevant causes may be manifold, e.g. changed (vertical) integration of enterprises or changed outsourcing of parts of the production. The figures of this Table provide only hints to changes; amplified substantiation would require specific investigations in the respective branches of industry.

Altogether, the public health system points to a slightly increasing interrelationship with other economic sectors. It should be noted here that this relates to structural changes, however normally they develop only over longer periods and therefore a change by more than one percentage point within scarcely 10 years indicates a distinct change. This change consists of increasing or decreasing interrelations of individual subdivisions of the health system with other economic sectors and structural changes of the public health system.

⁹ Amongst these are not only e.g. purchased food, but also laboratory services, specialised examinations requiring special equipment, etc..

3.2.3. Employment in the French public health system

The only in-depth analysis of the development of employment in the health sector in hand stems from Bocognano & Raffy-Pihan 1995.¹⁰ This survey includes only persons directly employed in the public health system, however it has abundant subdivisions. In comparison with the preceding sections a slightly different period has served as basis, since merely the years 1982 to 1992 are represented. This minor deviation should however not cause major problems with respect to statements on growth rates and employment shares; thus we may presume extensive compatibility.

With these limitations the development of employment in the French public health system is reflected adequately in Table 3.4. To allow for comparability with Austrian figures at a later date, we had to subsume them in larger groups.

Table 3.4: The development of employment in the French public health system, 1982 – 1992¹¹

	Employees in 1,000 1982	1992	Average annual growth rate
Providers of healthcare	1,083.1	1,284.1	1.7 %
Health industry	294.2	373.7	2.4 %
Aggregate public health system¹²	1,377.3	1,657.8	1.9 %
Share in total employment	6.4 %	7.4 %	

Source: Bocognano & Raffy-Pihan 1995, own computations.

For comparison: during the same period, aggregate employment in France increased annually by 0.3 % on average. Consequently, the health sector – measured by employment – increased disproportionately, showing a relatively stronger growth of employment of the health industry as compared with the domain of healthcare providers, i.e. the domains of hospitals and practitioners. The result is a substantially higher share of persons directly employed in the public health system in total aggregate employment.

¹⁰ Although Bocognano & Raffy-Pihan 1997 deal with the development of productivity in another study they do not supply comprehensive figures (or case by case slightly divergent figures) on employment.

¹¹ Although the delimitation between healthcare providers and the health industry was made identically at both points of time, it may appear somewhat blurred; however, good comparability with the data for Austria was taken into account.

¹² According to the afore-mentioned study by Bocognano & Raffy-Pihan 1997, employment in 1992 amounted to 1,574.000 persons.

3.3. The development of the Austrian public health system from 1984 to 1993

The Austrian objectives in both studies Brunner et al. 1999 and 2001 were very similar to the French ones, although the wording was somewhat different. A first goal was the description of the health sector as part of the economy including its interrelations with other sectors. Above all time series had to be generated for the period from 1981 to 1998 taking into account the ruptures caused by changes of the method of computation and definitions of macro-economic accounting (transition from ESNA79 to ESNA95). With these the bases for analysis and prognosis of the health sector's relevance were to be established.

In detail both the output side on the so-called production account (value added, intermediate consumption) and the utilisation side in the so-called commodity account (consumption, investment, export, intermediate use) had to be illustrated.

Moreover, interrelations with other economic sectors had to be computed by means of the input-output analysis including an analysis of their structure and development.

Finally, the employment effects of the health sector had to be shown, that is both persons directly employed in the public health system (direct employment) and also 'indirect' employment generated by interrelations with other economic sectors (purchase of intermediate input by the public health system).

3.3.1. Definition and methodology

In the Austrian investigations the health sector was defined as follows:

- Hospitals, public and private hospitals,
- Practitioners, general and specialists
- Long-term care
- Pharmaceutical industry
- Medical devices industry
- Medical trade

Because of the lack of detail in the statistical source material, there were difficulties in delimiting private hospitals and practitioners, general and specialists¹³. The medical trade also comprises retailing (such as pharmacies, bandage makers, ...). We

¹³ In the Austrian work the private hospitals were further subdivided into non-profit oriented hospitals and profit-oriented private hospitals.

tried to assess the trade with medical aids to vision separately from other goods traded with in this area (such as sun glasses, binoculars, etc.) by auxiliary computations.

The lack of a sufficiently detailed subdivision of the data material compelled us time and again to refer to auxiliary computations, to rely on other statistics or ultimately resort to (plausible) assumptions.

Production accounts and commodity accounts for the individual producers or commodities and services respectively were established based on annual macroeconomic accounting (SNA). Input–Output Tables of different years – this system of tables is not computed annually – allowed to display the interrelations between the health sector and other economic sectors.

Finally, direct and indirect employment was estimated based on employment statistics and their linkage with macroeconomic accounting and the results of the computations for the health sector (including interrelations).

3.3.2. The production accounts for the Austrian health sector: Production values, intermediate consumption, value added

The production accounts for the Austrian health sector are also shown in Annex 5, the tables displayed there include the years 1984–1993 and thus comprise the same period as the French ones. They represent an extract from available aggregate time series from 1981 to 1998. A modification was made in that the long–term care (assistance) area was taken out in order to allow comparability with the French computations.

From 1984 to 1993 GDP increased annually by 5.8 % on average, the health care sector by 8,2 %. As a result, the aggregate share of the health sector in GDP of 4.4 % in 1984 increased to 5.4 % in 1993.

The situation in Austria is similar to that in France, i.e. the public health system grows more rapidly in most subdivisions than the aggregate GDP (Table 3.5). The only exception appears in the area of practitioners, general and specialists, however its relatively slow growth is most probably due to a statistical error.¹⁴ Other below average growth areas were the medical devices industry and medical trade (the latter due to delimitation and other statistical problems). On the other hand, PV and VA rose strongly in the pharmaceutical industry and in the hospital area, the latter mainly in the private hospitals area (however from a very low initial level).

¹⁴ This assumption is based on the fact that for the first time a reliable assessment from the mid–nineties onwards led to a distinct increase of this share.

Table 3.5: Average annual growth rates (nominal), 1984–1993, in %

	Production Value	Value Added
Hospitals	9.3	9.5
thereof: private hospitals	14.8	14.9
public hospitals	9.0	9.3
Practitioners, general and specialists	5.2	5.6
Pharmaceutical industry	9.5	12.1
Medical devices industry	6.2	5.8
Medical–related trade	7.1	6.7
Aggregate public health system	8.0	8.2

Source: see Annex 5

This differing growth rate has caused a corresponding shift of the shares of individual subdivisions in PV or VA of the health sector, as can be seen in Table 3.6.

Table 3.6: Shares of the individual health producers in the aggregate public health system, measured by the Production Value and Value Added, in %

	Production Value		Value Added	
	1984	1993	1984	1993
Hospitals	49.7	55.3	51.4	57.4
thereof: private hospitals	1.9	3.2	1.8	3.1
public hospitals	47.9	52.1	49.6	54.4
Practitioners, general and specialists	26.0	20.5	29.7	23,8
Pharmaceutical industry	9.9	11.3	4.7	6.5
Medical devices industry	5.5	4.7	4.5	3.7
Medical–related trade	8.8	8.1	9.7	8.6
Aggregate public health system	100	100	100	100

Source: see Annex 5

Measured by production values and value added, the Austrian shares also develop in equal steps in the same direction. Here the great share losers are the practitioners

and to a lesser degree the medical trade. All other areas succeeded in winning shares, albeit at differing degrees.

It should be noted here, that in the following years, i.e. after the year 1993, – the Austrian investigations extend to 1998 – Austrian medical doctors were able to clearly catch up again; assumedly this ‘result’ was essentially due to statistical errors in the late eighties and early nineties. The importance of trade also increased in subsequent years, but here again statistical delimitation and coverage errors may be responsible for blurs; therefore the numerical development may not reflect reality entirely.¹⁵

As indicator for the interrelations of the health sector and its subdivisions with other economic sectors we are again using the share of intermediate consumption in the production value. These shares are shown in Table 3.7 for selected years.

Table 3.7: Shares of intermediate consumption in Production Value for selected years, in %

	1984	1989	1993
Hospitals	30.2	29.6	28.7
thereof: private hospitals	35.4	35.4	34.6
public hospitals	30.0	29.3	28.4
Practitioners, general and specialists	23.0	21.8	20.5
Pharmaceutical industry	67.9	60.7	60.6
Medical devices industry	44.7	45.3	46.4
Medical-related trade	25.1	26.4	27.4
Aggregate public health system	32.4	32.0	31.4

Source: see Annex 5

Altogether the Austrian public health system shows a slightly retrograde interrelationship with other economic sectors, this decline being found with almost all subdivisions, solely the medical devices industry and the medical-technical trade show an increased share of intermediate input. The practitioners and the pharmaceutical industry show the strongest decreases.

¹⁵ Both developments encumbered the hospital area, and above all the public hospitals.

3.3.3. Employment in the Austrian public health system

From the study by Brunner et al. 2001 we took direct employment (employees and self-employed persons) and summarised it as follows (Table 3.8):

Table 3.8: The development of direct employment in the Austrian public health system, 1982–1992

	Employees in 1,000 1982	1992	Average annual growth rate
Providers of healthcare	152.6	202.5	2.9 %
Health industry	24.9	33.7	31 %
Aggregate public health system	177.5	236.2	2.9 %
Share in total employment	5.1 %	6.4 %	

Source: Brunner et al. 2001, own computations.

The point of reference for the following short comments is the growth of total employment, which attained approximately 0.6% as annual average for this period.

We also observe a distinct above average growth of employment in the Austrian public health system, with a slightly higher growth rate of the health industry in comparison with healthcare providers.

As a consequence, we observe a strong increase of the share in aggregate employment from 5.1 to 6.4 %.

3.4. Differences and similarities between the French and the Austrian public health system, 1984–1993

We will now compare and analyse the structures and developments of the public health system in France and Austria, which have been presented in summarised form in the two preceding sections. Beforehand, we must establish that the following explanations can only be regarded as first guiding principles on account of evidently different public health systems with varied institutional forms and structures and also substantially different absolute sizes. In our opinion a more detailed analysis could only be elaborated by a team of researchers that is familiar with at least one health system of the countries to be compared.

The comparisons are made in two sections: in the following section 3.4.1. the structures and developments resulting from macroeconomic accounting are compared and processed, in section 3.4.2 the developments of employment are compared.

3.4.1. Comparison of Production Value, Value Added and Intermediate Consumption

In Figure 3.1 developments of value added and production value in both countries in the period from 1984 to 1993 are presented.¹⁶ The similarities of growth in value added and production value in each country are clearly recognisable: In each case these two curves run closely together, almost parallel. The graph also clearly confirms the stronger growth of the Austrian health sector compared to France from 1990 onwards.

And how did the two individual partial aggregates within the health sector of the two countries develop? Figures 3.2 and 3.3 referring to the so-called service providers, that is hospitals and practitioners, general and specialists, and Figures 3.4 and 3.5 referring to the health industry (pharmaceutical industry, medical-technical industry and medical trade) elucidate this question.

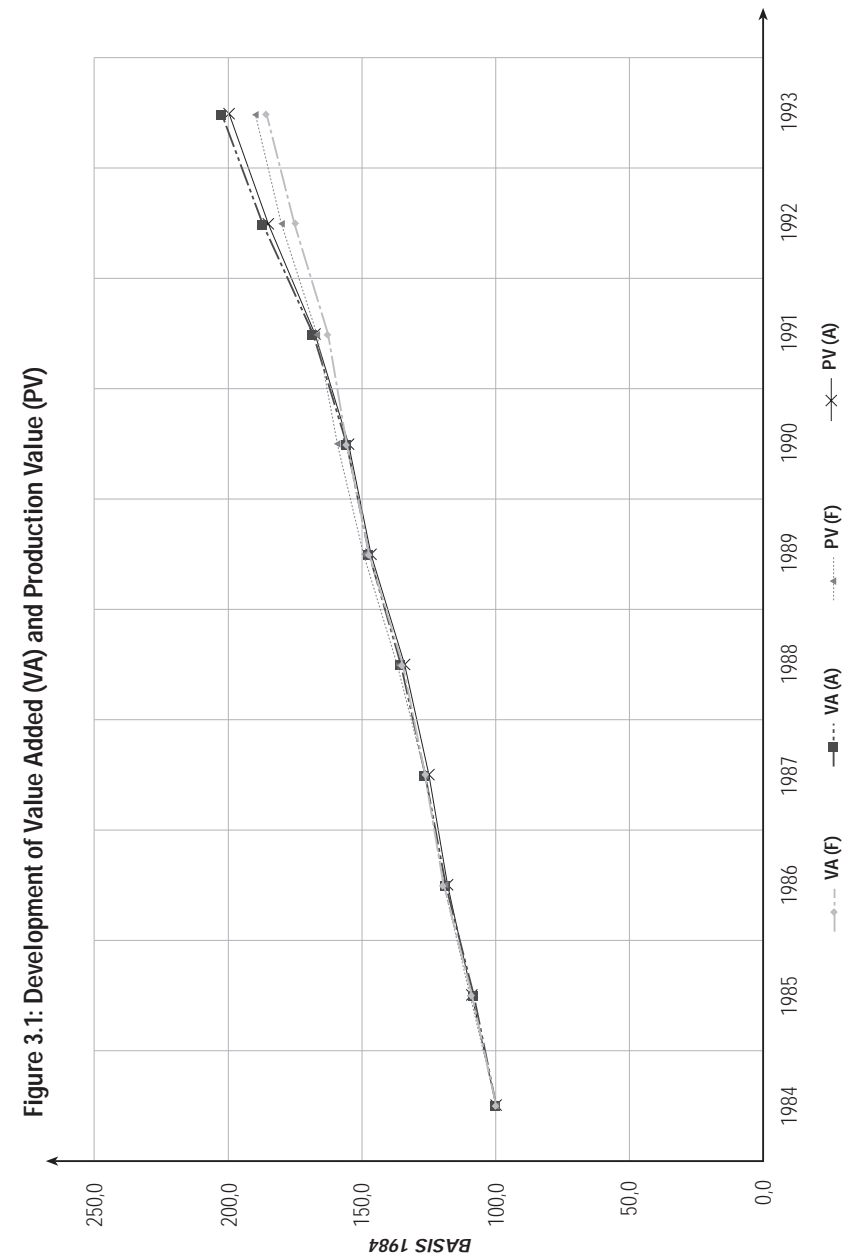


Figure 3.1: Development of Value Added (VA) and Production Value (PV)

16 In Figures 3.1 – 3.5 the proportional increase as opposed to the base year is marked on the vertical axis. Consequently, the value 100 in Figure 3.1 means that the Austrian production value was 100 percent higher in 1993 than in 1984, i.e. the production value of the health sector has doubled during this period (nominally, disregarding inflation).

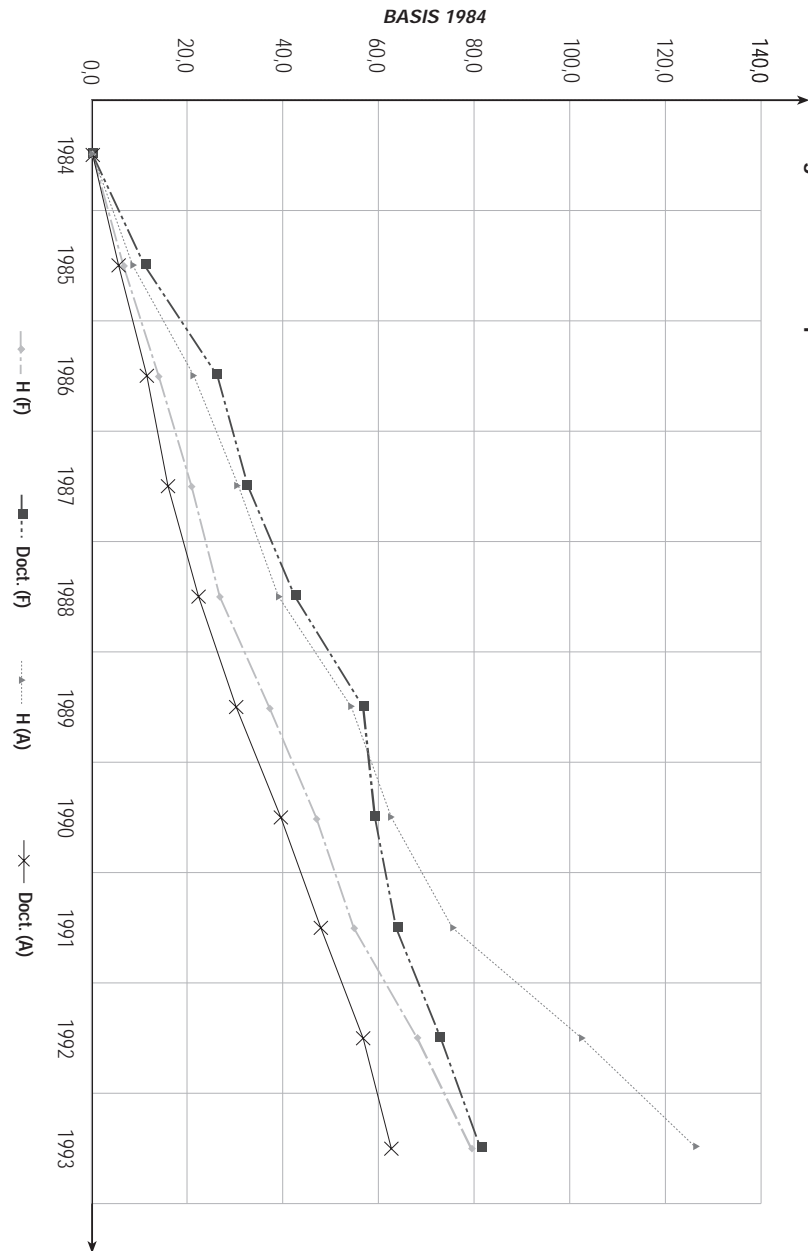


Figure 3.2: Development of Value Added – Healthcare Providers

Two differing developments in the domain of healthcare providers are striking: While production growth of the medical doctors was stronger in France, this situation of the hospitals is precisely the reverse. Especially from the beginning of the nineties, the Austrian hospitals show a very strong expansion, which explains probably fully the stronger growth of the Austrian health sector in the last years of the observation period described further above.

The individual subdivisions within the health industry present a differentiated picture. In both countries the pharmaceutical industry records the strongest growth rates (especially when measured by the value added of this industry), and the growth rate of value added in the Austrian pharmaceutical industry stands out in particular.

In the first part of the investigation period the growth rates of the medical–technical industries rose rather similarly in both countries, in the second part the growth rate of the French medical devices industry was stronger than the Austrian rate.

After the pharmaceutical industry the medical trade presented the strongest growth – again in both countries. However in this domain the growth of the production value and value added was substantially stronger in France than in Austria.

The shares of intermediate consumption in production value as a global measure for the interrelationship of individual areas of the health system with other economic sectors are directly comparable.

In the domain of healthcare providers (Figure 3.6) hospitals in Austria purchase distinctly more intermediate input in comparison with the practitioners in relation to the production value. In France the shares of hospitals and practitioners are rather close to one another – the same applies to the two Austrian values (hospitals and medical doctors). This means that while a comparison of the two countries reveals that the Austrian hospitals have a higher intensity of intermediate input, the share of intermediate input of Austrian medical doctors remains distinctly below that of their French colleagues.

Considered over time, the shares of intermediate input in France are rather constant, while both shares are distinctly retrograde in Austria. This implies that in Austria the value added of healthcare providers (as the complement to intermediate input) has risen in relation to the production value, at least from the mid–eighties to the beginning of the nineties.

The distinctly higher intermediate input of French medical doctors as compared with Austrian medical doctors (27 % versus 21 %) indicates a distinctly higher purchase of input from other enterprises by the group first–mentioned.

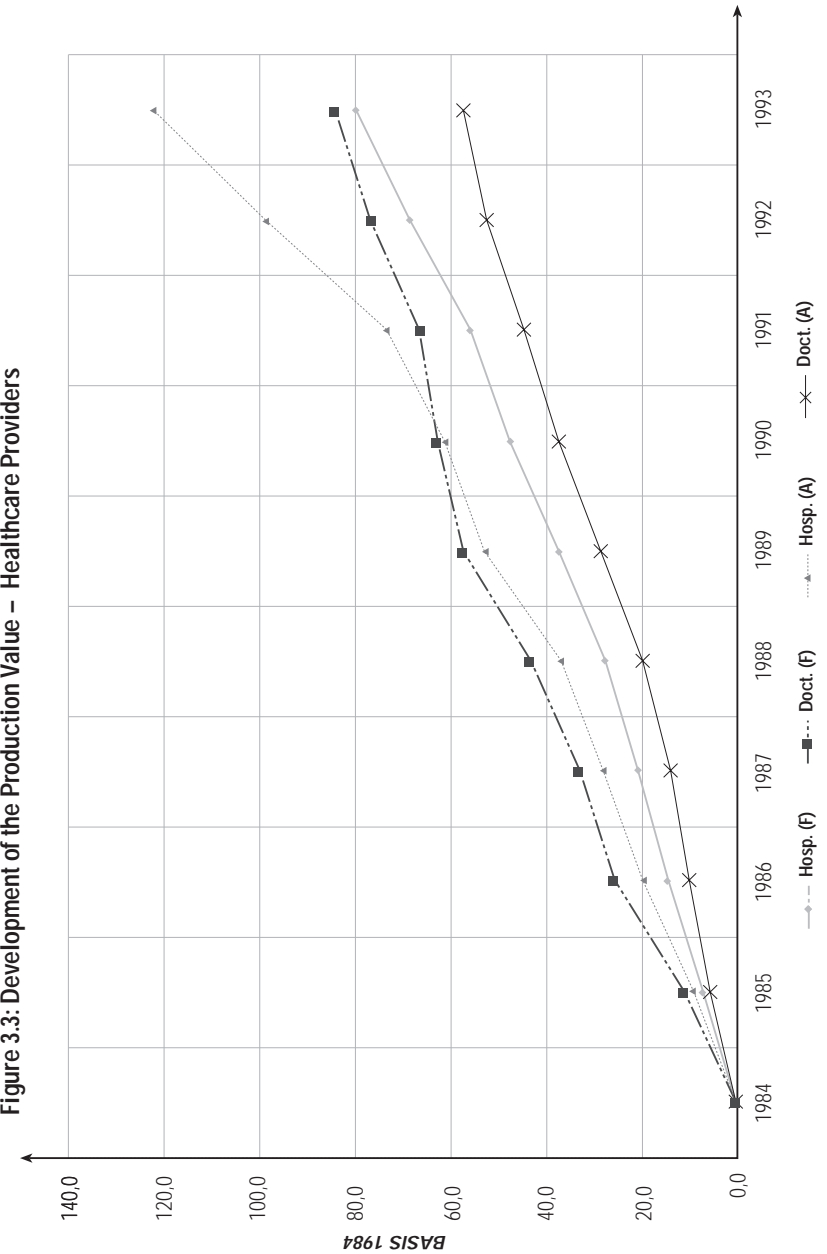
In the sector of the health industry the first striking factor is that both countries present similar interrelation structures: the curves of each industry always run closely together. (Figure 3.7).

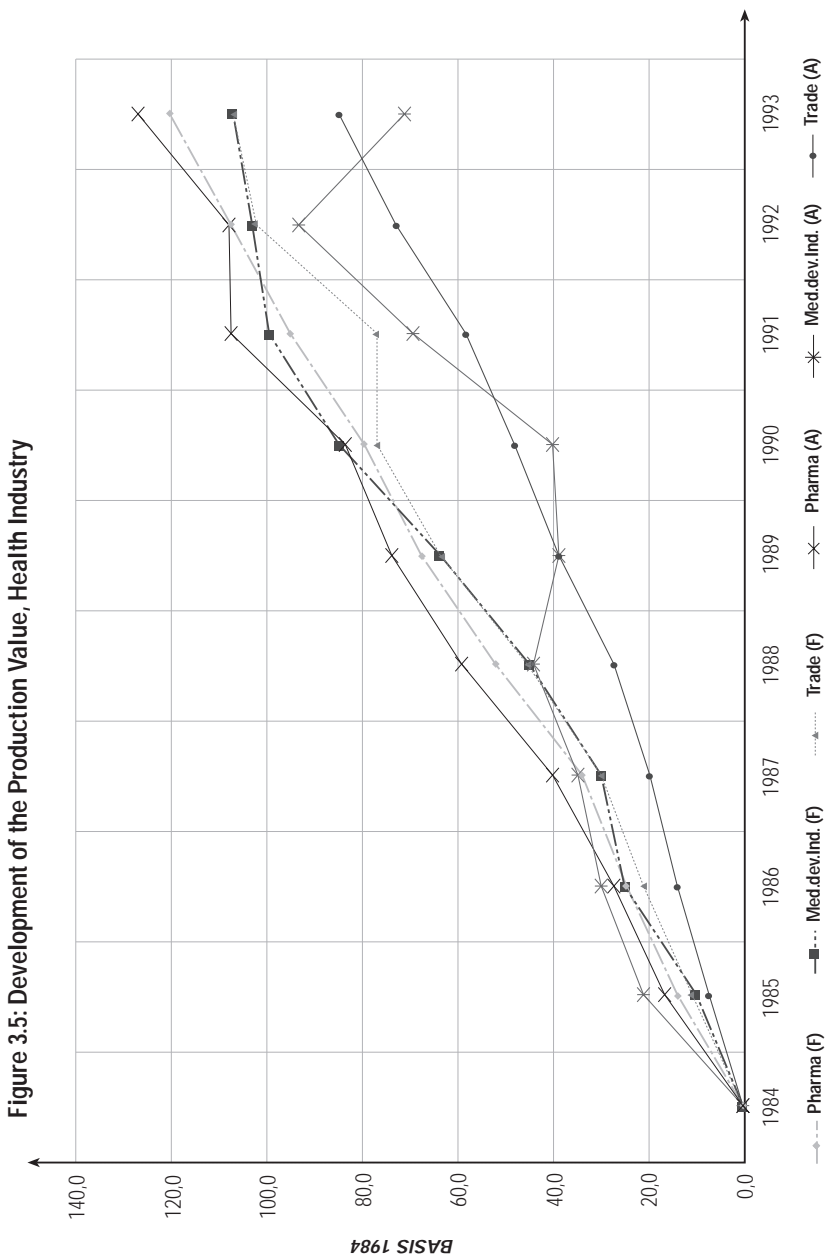
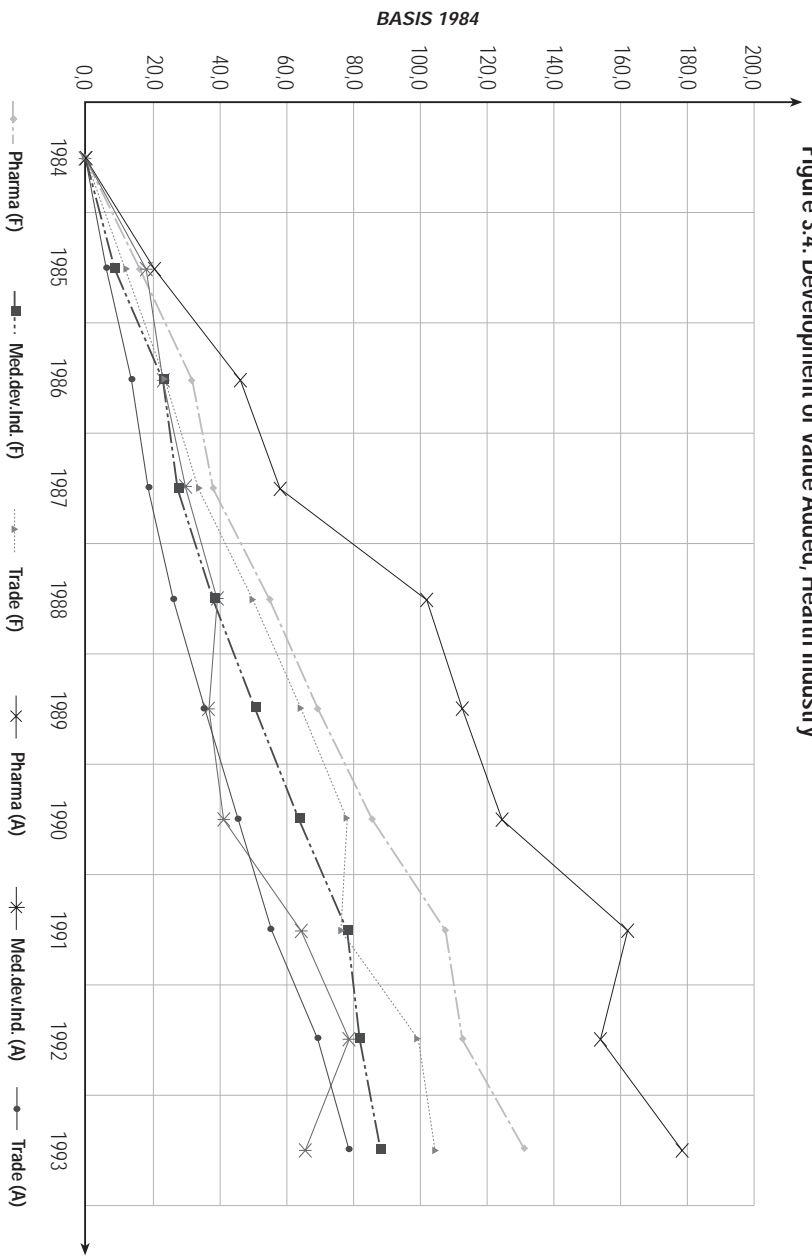
As anticipated the levels of the shares are also noteworthy, the highest level is that of the pharmaceutical industry, the lowest level is that of the trade as service providers.

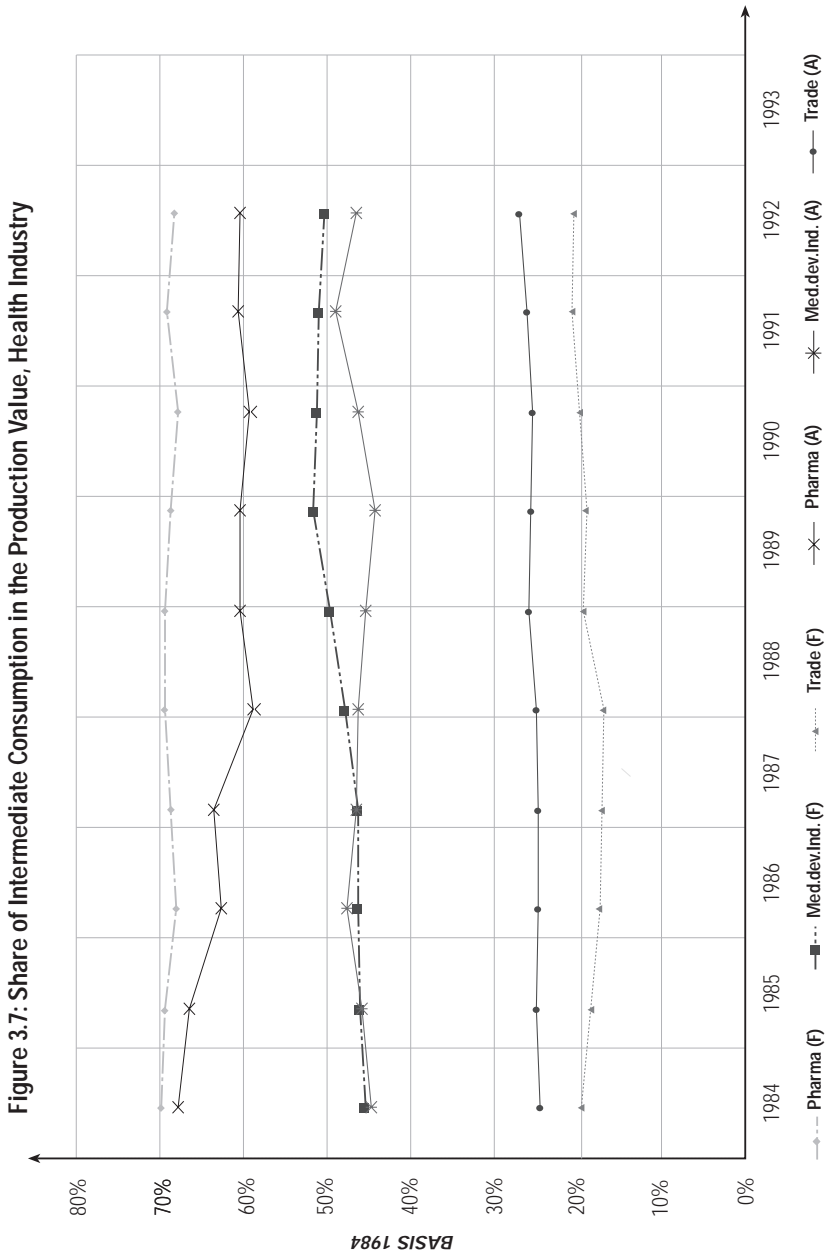
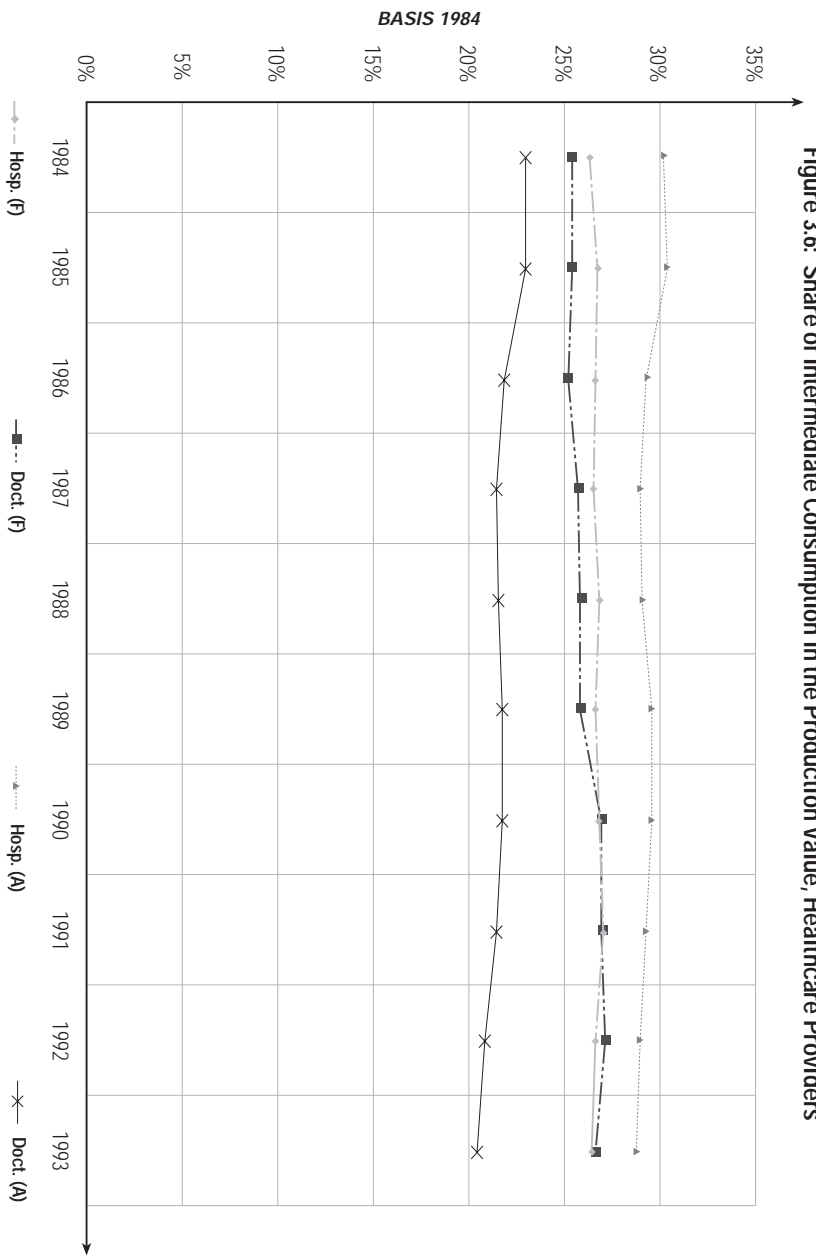
The difference of levels is distinct in medical trade between Austria and France. Are the services of the trade or the gross trade margin in France really lower than in Austria?¹⁷

17 In this instance, computation problems (Austria, see Brunner et al. 2001) or differences in definitions may be an important factor. E.g. the pharmaceutical wholesale trade in France is part of the pharmaceutical industry. May this serve as an example, i.e. that generally speaking, comparisons are certainly admissible, however they must be interpreted cautiously.

Figure 3.3: Development of the Production Value – Healthcare Providers







While the shares of intermediate input of the pharmaceutical industries are still close to one another at the beginning of the period, the share for Austria clearly decreases in the first half of the period under examination while it remains unchanged for France. This leads to an absolute and also relatively important difference in the last years of observation. Our analysis can only display this result, but cannot substantiate which structural changes of the Austrian pharmaceutical industry are behind these developments.¹⁸

How high are the shares of individual subdivisions of the public health system in the aggregate health sector, how do they differ between France and Austria, and how do they change within this period of ten years? Answers to these questions can be found in the following graphs (Figures 3.8 to 3.15). France and Austria are compared with each other always on the same page, for a specific year, first 1984, then 1993, thus measuring the distribution by both the value added and the production value.

The hospital area as the biggest producer within the health sector dominates in both countries. The share of public hospitals in Austria is higher than in France and rising in this decade. In France, on the contrary, private hospitals are of greater and also increasing importance. In Austria we also recognise a growth of the still small share. These statements apply to both the shares in production value (PV) and also in value added (VA).

Proceeding from similar shares of practitioners (in each country higher measured in value added than in production value) we observe a decrease of the share of medical doctors in the aggregate production of the health sector. It should be emphasised here, that in view of the strong growth of the aggregate sector, the 'output' of the medical profession has, of course, increased absolutely.

Within the scope of the health industry, the growth of the share of the pharmaceutical industry is particularly noticeable, above all when measured by the production value.

It is interesting to note that although the medical trade is still ranking second behind the pharmaceutical industry even at the end of the period with respect to production value, it shows a higher share of value added in the aggregate health sector.

As mentioned before, the medical devices industry is relatively more important in Austria than in France, which is recognisable, among other things, by the respective differing shares. These shares vary only slightly in both countries, France and Austria, that is to say, this industry grows approximately in accordance with the average rate of the aggregate public health system.

¹⁸ The decrease occurred between 1984 and 1988, thereafter the share of intermediate consumption in production value remained constant.

Figure 3.8: Shares in Value Added, F, 1984

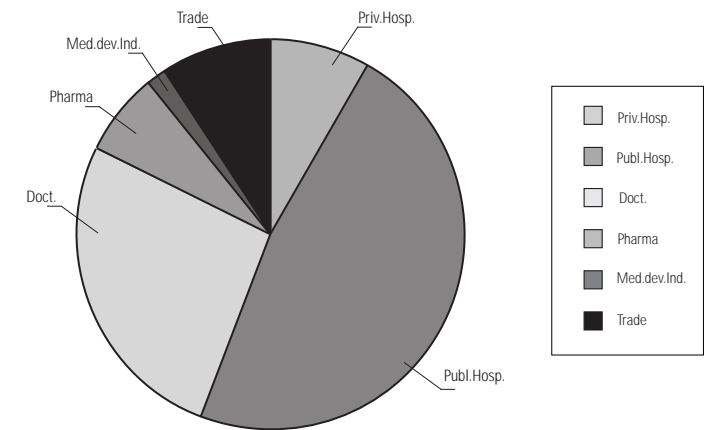


Figure 3.9: Shares in Value Added, A, 1984

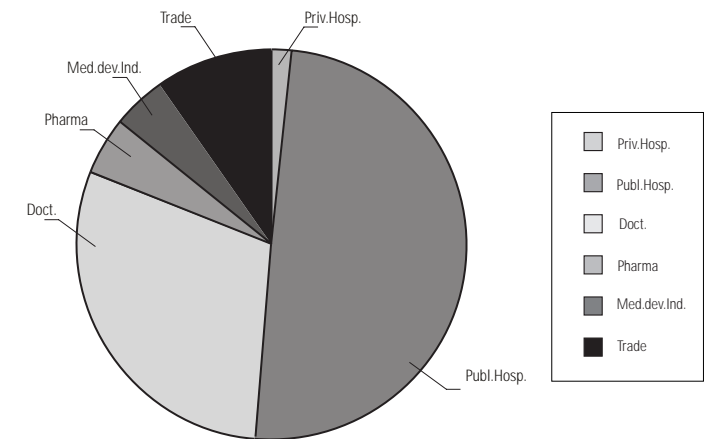


Figure 3.10: Shares in Value Added, F, 1993

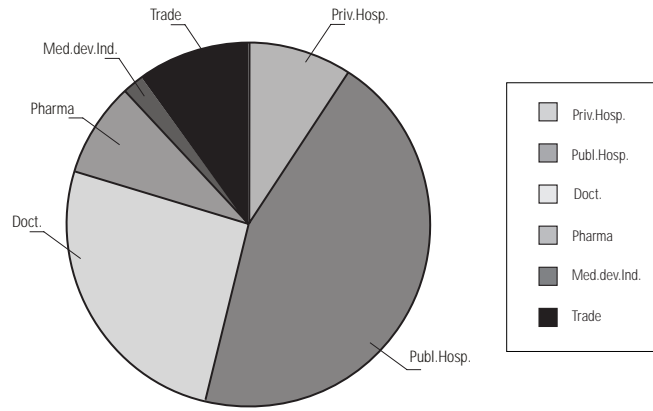


Figure 3.12: Shares in Production Value, F, 1984

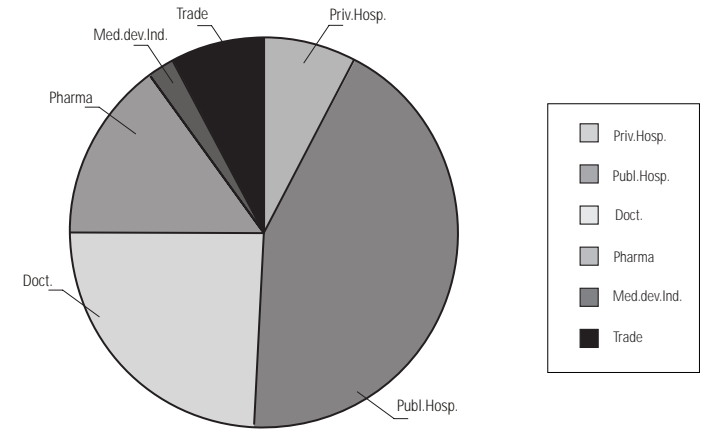


Figure 3.11: Shares in Value Added, A, 1993

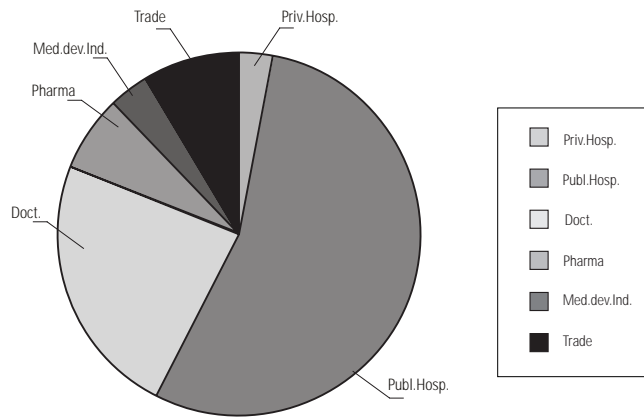


Figure 3.13: Shares in Production Value, A, 1984

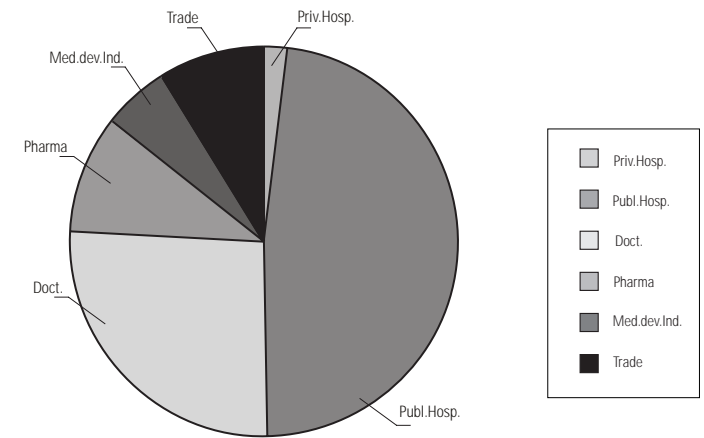


Figure 3.14: Shares in Production Value, F, 1993

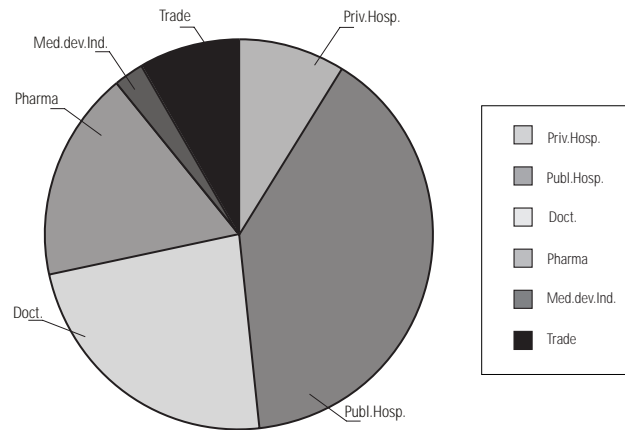
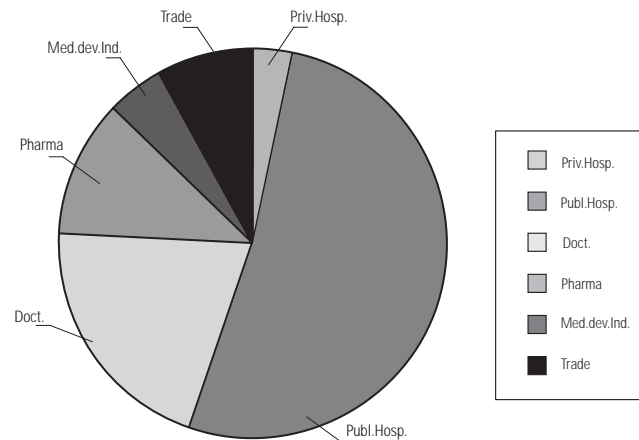


Figure 3.15: Shares in Production Value, A, 1993



3.4.2. Employment in the health sectors of France and Austria

Unfortunately, a detailed comparison with respect to employment similar to the one we just completed for the production side, is not possible. There are several reasons for this situation.

It is true that there is a time series for Austria which includes the period investigated in France, but it is a global one, meaning that – due to the lack of data – it is not subdivided into employees in the various subdivisions nor into professional groups like in France. The French figures available to us are not a continuous time series, but contain solely selected years.

The Austrian data present two subdivisions according to direct employment in the public health system and according to indirect employment caused by the public health system in other branches of economic activity, the latter information is missing in the French data.

A subdivision according to self-employed persons and employees contained in the Austrian analyses is not shown in the French documents. On the other hand, the French investigations show a very detailed division by areas (not just medical doctors, these were again subdivided) and for these areas according to qualification levels and occupational groups. This degree of detail does not exist in comparable form for Austria.

Going beyond our analyses, the development of labour productivity in the French public health system is also highlighted.

In accordance with the macroeconomic approach of this paper we therefore limit ourselves to direct aggregate employment in the health sector.

The following graph (Figure 3.16) shows the distinctly different levels of employment shares of the health industry in France and Austria, which present noticeable stability over time.

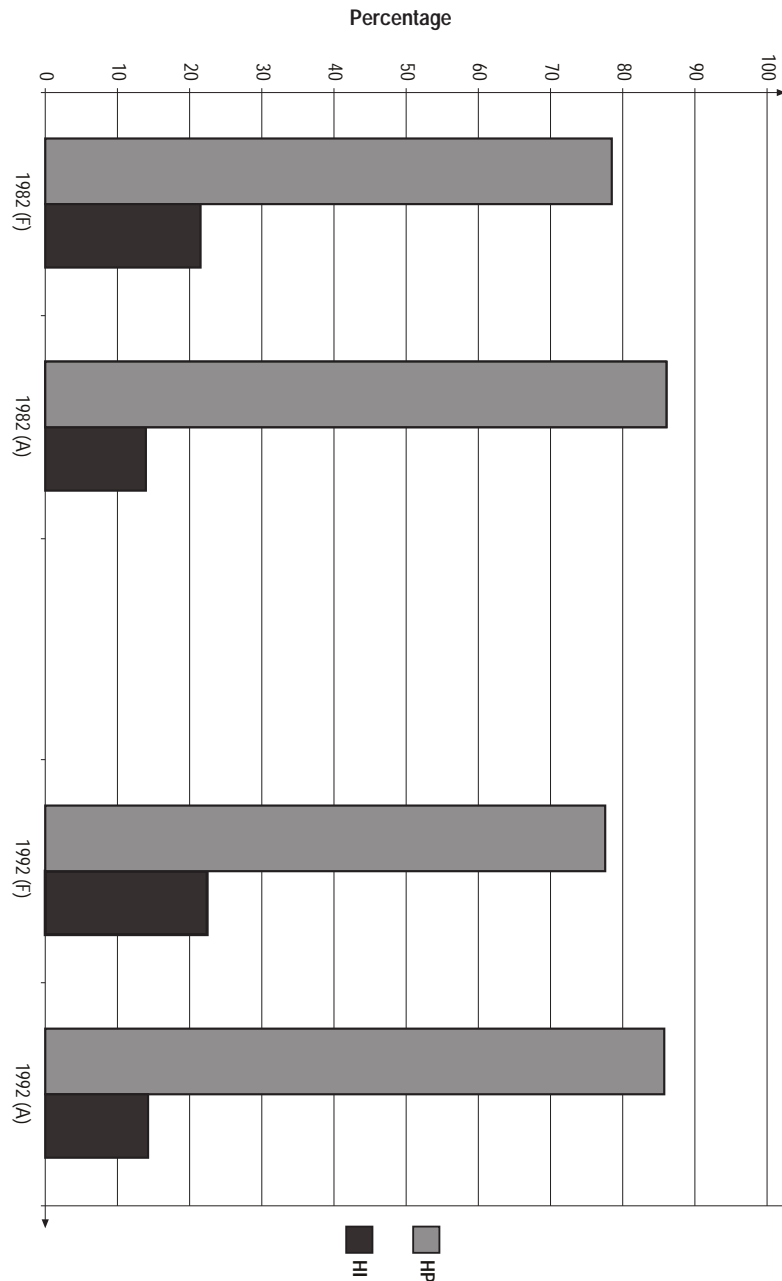


Figure 3.16: Employment shares of Healthcare Providers (HP) and the Health Industry (HI) in employment in the health sector

4. SUMMARY, CONCLUSIONS, PROSPECTS

Essentially, at this stage the work presented is to be regarded as a pilot study. To the best of our knowledge, it represents a first attempt to compare the health systems of two countries with each other from a macroeconomic point of view.

The basic question posed for the two country studies for France and Austria was to ascertain the contribution of the health sector to the economy on the basis of national income accounting and some further statistical material. This contribution is measured by the production value and the value added, the interrelationship with other sectors of the economy being demonstrated by (at least) intermediate input (i.e. intermediate consumption) covering procurement by the public health sector from these other sectors.

A second important area of investigation were the effects of employment in the public health system. Interest was focused primarily on employment in the health sector (i.e. direct employment).

Not only was a snapshot for one or two years to be obtained for the two countries, but development was to be shown over a period of one to two decades. The French work covered a period of approx. one decade, the Austrian studies, on the other hand, nearly two decades. In addition, the period for France was embedded within the Austrian period, thus there were good preconditions for comparisons from this aspect.

Our comparative study is based on the period from 1984 to 1993 for an analysis of relevant macroeconomic developments. With regard to employment, we considered the period from 1982 to 1992. These restrictions were imposed by the French studies, the period from 1981 to 1998 being available for the Austrian public health system.

There were basic similarities with respect to access to the theme. However, a multiplicity of differences arose in practice. Consequently, we limited the comparison to rather broad aggregates, quasi as the 'lowest common denominator', because for various reasons – not least statistical ones – we thought that this method would allow us to move on more solid ground.

We are in fact very aware that differences in the health systems permit only limited comparisons or require these differences to be taken into account when interpreting divergent developments in the public health system in different countries. Readers should also bear this in mind.

However, subject to these restrictions, we were able to point to a series of similarities and differences between the health sectors in France and Austria that – as the work is continued in time and in content – will undoubtedly provide criteria for creative discussion, the results of which should lead to better understanding of economic trends in this area, and consequently ultimately open up new perspectives for decisions in social policy.

The preceding sections will not be repeated below, attention is being drawn merely to some particularly noteworthy aspects.

- In principle, the share of the health sector in total value added of the two economies (higher share for France) as well as the growth in this sector (rather higher for Austria, especially in the last years of the period under examination) during the period analysed are broadly comparable by order of magnitude. This statement also applies when considering production values.
- Compared to France, the hospitals area ‘exploded’ in Austria in the early nineties.
- Private hospitals play a comparatively moderate role (as yet) in Austria but are expanding faster than the public sector.
- Both in France and in Austria, the pharmaceutical sector has shown particular growth within the public health system.
- The medical trade is increasing in importance in both countries. In terms of value added it has already superseded the pharmaceutical industry.¹⁹
- The medical devices industry (although absolutely smaller) is of relatively greater significance in Austria than in France.
- The interrelations with other sectors of the economy in both countries are altogether similar in each subdivision.
- The extent of interrelations in Austria for medical doctors and especially for the pharmaceutical sector decreases in the second half of the eighties, while it tends to remain constant in France.
- In both countries (direct) employment in the health sector rises faster than in the economy as a whole, towards the end of the period under investigation every thirteenth person or so, in Austria every fifteenth, is directly employed in the Health sector.²⁰

19 Caution: Definitions and statistical measurement could nonetheless result in distortion; the increasing importance of trade still holds good.

20 According to the Austrian research, around every tenth person was directly or indirectly employed in the Health sector at the end of the nineties.

This study can only reveal the development briefly summarised and consequently supply criteria as to the points of substance to be clarified. The necessary answers must come from experts in the public health system and in individual subdivisions.

What form could a continuation of this work take? Directly linking to the preceding paragraph: an analysis in greater depth of the differences and developments in the individual subdivisions would be a potential next step. The stronger standardisation in macroeconomic accounting and other statistics within the European Union might make projects of this kind substantially easier.

It would be desirable for other member states of the European Union (and also other, in particular developed economies) to be included – perhaps even before the procedure suggested above. We expect a broadening of this kind to produce a multiplicity of impulses and revelations that should ultimately contribute to decision-making in health policy.

This requires greater topicality – and that would be our next wish. Analyses are indicated here as a possible compromise between the political need for especially topical data (if possible from the previous month!) and the availability of complex statistical material, from a database not more than 1 to 2 years old. With this often apparently lengthy time lag, one problem is to be considered, namely that our concern here is largely to display structures and their developments. However, structural changes occur only in the medium and long term, and structures cannot in general be changed much faster without high friction cost.

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- Le Figaro: La production de santé, 11 septembre 1997 (Jean-Jacques Rosa)
- The New York Times: Health Care as Main Engine: Is That So Bad? November 11, 2001 (David Leonhardt)

ANNEX 1: WORKING SESSION HOPE

1. Agenda

for the first working session within the scope of the project

‘HEALTH AS A GROWTH FACTOR’ – A COMPARISON
BETWEEN THE NETHERLANDS, GERMANY AND AUSTRIA”

TIME: 3 November 2000, 10 a.m. to 5 p.m. (max.)

PLACE: Bundesministerium für Soziale Sicherheit und Generationen (BMSG)
(Federal Ministry for Social Security and Generations)
Radetzkystr. 2, 1030 Vienna, conference room 6K22

- 10:00 – 10:30 Welcome, opening and introduction.
Representatives of the BMSG
- 10:30 – 11:00 Summary Presentation of the project concept and work rendered
by the Austrian partners to date.
REINER BUCHEGGER
- 11:00 – 11:30 Macroeconomic analyses of the public health system in the
Netherlands.
WINFRIED DE GOOIJER
- 11:30 – 12:00 Macroeconomic analyses of the public health system in Germany.
STEFAN ACHNER
- 12:00 – 12:30 Discussion
- 14:00 – 17:00 Continuation of discussions conducted in the morning.
Raising fundamental ‘technical’ questions:
Definition and delimitation of the health sector,
Questions relating to comparability of basic statistical
data, Interrelationship of the health sector (I–O analysis),
Methods of annual updating, other aspects.
(These items could be introduced by a statement of the
Austrian partners.)
Planning of further procedure.

Linz, 2 November 2000

Reiner Buchegger

2. Summary of the meeting, November 2000

2.1. Preface

Immediately after the establishment of the contract for this project, the partners from Germany and the Netherlands were contacted. It was agreed upon that a first meeting should take place in Vienna on Friday, Nov. 3, 2000. The organisation was ensured by the ‘Federal Ministry of Social Security and Generations’ (Bundesministerium fuer Soziale Sicherheit und Generationen), the agenda was drawn up by the project manager (see Annex 1).

In preparation of the workshop the analyses with relevance to the current project carried out so far were transmitted to the two partners, in particular the report of the preceding project ‘Health as a Growth Factor’ (Gesundheit als Wachstumsfaktor) both in the long and short versions issued by the Ministry.

Additionally, we submitted a detailed description of the computational procedures, data bases, other sources of information to the partners, including the assumptions underlying the study Economic Health Reporting (‘Volkswirtschaftliche Gesundheitsberichterstattung’) the first part of which consists of an annual time series of the detailed National Accounts – similar to the ones presented in the first part of the above mentioned study ‘Health as a Growth Factor’ for just two points in time – for the years 1981 through 1994. These documents are shown in Annex 2 and Annex 3, respectively below. The second major part will be the creation of a time series for the years 1990 through 1999, which will in turn be one of the inputs for the current comparative study between the Netherlands, Germany, and Austria. (A third part will contain an analysis of the differences arising from different concepts in national accounting for the years 1990 through 1994 for which we will have time series for both the old and the new regime.)

2.2. Methodology and definitions

The meeting was conducted along the lines set by the agenda. Extensive discussions on the main objectives and goals of the study were initialised. Methodologies to be employed, potential extensions, definitions and delimitations of the health sector, organisational aspects and both the overall time horizon as well as next steps were discussed intensively. The major results of the discussions could be summarised in brief as follows:

There was consensus that the Austrian study (or studies, respectively) would – methodologically – form the bases for the studies in Germany and in the Netherlands and thus for the comparative study.

In the presentations by the partners from both countries during the first section of the workshop several suggestions were made as to possible extensions of the analysis which would enrich the study significantly. Examples of these extensions included in particular

- public vs. private expenditures on health
- the section on employment, direct and indirect, ought to be expanded
- effects of healthcare on productivity
- more intense positive positioning of healthcare
- investment in the health sector as contribution to improved infrastructure
- development of the health sector in comparison to other sectors of the economy
- the educational dimension of the health sector including research
- tax revenue generated by the health sector, particularly in local and regional analyses
- export of health services as a perspective for the future

There was agreement on the broad categories to be contained in the definition of the health sector. The analyses should cover

- hospitals
- additionally, all medical doctors practising outside the hospitals
- social services for the elderly and others in need of special care
- the pharmaceutical industry
- the medical devices industry
- wholesale and retail trade related to the two previous sectors.

2.3. Further proceedings

Following general agreement on methodology and scope of studies to be carried out at national level and to be integrated into the comparative study the next steps to be taken were considered.

Information should be transmitted by the German and Dutch partners on the type and coverage of comparable statistics and analyses available in their respective countries.

These should include

- the details of the annual national accounts pertaining to the health sector according to the broad definition stated above;

-
- availability and coverage of the input–output tables to be employed;
 - any other statistical material relevant to economic aspects of the health sector;
 - reports, annual or otherwise, previous economic analyses of the public health system etc.

The (junior) experts to be employed in these projects should mutually study the information both nationally and for the other two countries concerned. After intensive exchange on questions and problems via available means of communication, a meeting of these experts for clarification, discussion and co–ordination of the national studies was envisioned in order to ensure the highest possible comparability.

Wherever possible, other experts in the three countries concerned working in this field should be contacted and their advice and participation secured in a meaningful way.

The task of the project co–ordinator is to distribute all information received to the other partners and thus guarantee full transparency. Copies of all, say, bilateral exchanges should also be sent to the project co–ordinator, with an indication to whom the information has already been transmitted.

On account of the complexity and sensitivity as well as the pioneering character of the project, care should be taken to guarantee the highest level of professional standards.

Considering this dimension agreement was reached on that the execution of the study will probably take up to one year. Thus the Fall of 2001 has been set as a probable date for the completion of the comparative study with a potential presentation in the Spring of 2002.

ANNEX 2: METHODOLOGICAL NOTES ON THE STRUCTURAL ANALYSIS OF THE AUSTRIAN HEALTH SECTOR – AN OVERVIEW

1. Introduction

The objective of two studies commissioned by the Austrian Ministry for Social Security and Generations (Brunner et al. 1999, 2001) was an analysis of the evolution of the Austrian Health sector from a macroeconomic point of view in as much detail as possible. Thus we developed a time series, eventually ranging from 1981 through 1998, focussing on the production of the health sector (production accounts) and the goods and services provided by this sector (commodity accounts). In addition we tried to show the interactions of the health sector with the other sectors of the economy, i. e. the flow of goods and services between the sectors, by means of a detailed input–output analysis specifically relating to health. Finally, we employed these results to derive the growth of employment both in the health sector directly and the employment generated indirectly by this sector in other branches of economic activity.

The major data bases were the System of National Accounts for all years concerned, the Input–Output Tables (which have been compiled in Austria for the years 1983, 1990, and 1995), Production Statistics, Statistics of Foreign Trade, Employment Statistics as well as some others (e.g. Census of Production Units, OECD–Health Data, Population Census etc.). One major obstacle faced was the change in statistical reporting due to Austria's accession to the European Union in 1995 which constituted a major disruption in methodology, concepts, and definitions, in our case particularly in national accounting and production statistics with the ensuing consequences for the latest Input–Output tables for 1995²¹.

2. Definition of the health sector

The health sector in our definition consisted of the following production units:

- Medical practitioners, general and specialists

21 Affected were in particular the classification of production (new: NACE in its Austrian version ÖNACE) and the classification of commodities (new: CPA or ÖCPA, resp.).

-
- Hospitals, subdivided into public, private non–profit, and private profit–oriented
 - Long–term care
 - Pharmaceutical industry
 - Medical devices industry
 - Medical–related trade, both wholesale and retail, relating to both industries shown above.

Accordingly the health goods and services were made up of

- Health services (rendered essentially by medical doctors and hospitals, including therapy)
- Long–term care
- Pharmaceutical goods
- Medical devices
- Trade services (wholesale and retail) related to the two goods categories shown above.

It should be noted here that this definition is broader – compared to e. g. the OECD definition – through its inclusion of the long–term care sector. On the other hand, it neither contains the services rendered by insurance companies related to health (an omission of minor importance) nor the investment expenditures in the health sector.²² The so called ‘wellness sector’ is also not covered by our analysis.

3. The production accounts

These accounts consist of two parts, viz. the cost side and the revenue side.

On the cost side there is, of course, the distinction between value added and intermediate input which add up to gross production value. Value added was then subdivided into workers' compensation' (consisting of gross wages and salaries, 'employers' contributions, and imputed pensions, the latter for the public service); plus commodity taxes (= indirect taxes) minus subsidies; plus gross profits. These figures were taken essentially from the published national accounts utilising in many cases, unpublished working tables from Statistics Austria (Austria's Central Statistical Office) and the input–output tables for the years 1983, 1990 and 1995²³

22 Depreciation is included as a cost item, in principle, although we suspect some 'under–reporting' in this respect.

23 In principle, the descriptions in this and the following sections refer to these three years. Inter– and extrapolations will be described in a separate section (cf. section 7 below).

Frequently the figures in the final publications and the raw data (for internal purposes), from which we had to draw, would not be in full accordance. Thus, we had to make meaningful assumptions, such as using the final figures from the published data and dividing them according to the shares of the raw working tables in order to split e.g. the aggregate 'private health production' into 'production by practising doctors' and 'production by private hospitals'). Similar procedures had to be followed in other segments of the health sector.

Whenever the details for one of our subdivisions were unavailable (including even working tables) we usually assumed that the lower level (= finer classification) followed the same pattern as the (available) higher level.

An example: For the pharmaceutical industry we have no information whatsoever on the division of value added into its components; so we used the shares of the next higher level, in this case the chemical industry (of which pharma is a part), to subdivide the value added of the pharmaceutical industry.

Sometimes we would not even know the gross production value of a health subdivision from national accounting. In that case we drew on other statistics, e. g. the Census of Production, adjusting these raw data to fit the overall GDP or Input–Output framework.

On the revenue side, we differentiated between the various services rendered, such as healthcare, social service, and the various health goods, such as pharmaceuticals and medical–devices goods as well as health–related trade services.

The computation of the revenues for medical doctors and private hospitals was straightforward since they only produce healthcare services. The composition of the revenue–side of the production accounts for the remaining subdivision of the health sector could be computed either directly from the published input–output tables, sometimes with the aid of unpublished working tables, or had to be derived from the commodity accounts.

In line with the description of the cost side above, we proceeded similarly whenever the details of the revenue side for one of our sub–sectors was unknown: Use of working tables (when available), or applying the relations of the next–higher sector, or utilising other sources of information – or employing a combination of some or all of these methods in order to arrive at the best estimate possible under existing informational constraints.

Finally, a special problem should be mentioned with respect to the valuation of revenue from 1995 onwards: According to the European System of National Accounts 1995 (ESNA 1995) a government or a non–profit unit that covers more than 50 % of

its cost through 'sales' (i. e. revenue and not subsidies) is considered to be a 'market–producer'; according to ESNA 1995, its (usually) negative gross profit is deducted from the other components of the gross production value. In order to achieve continuity with previous definitions we did not follow this practice and considered the subsidy covering the negative gross profit as part of the revenue and thus part of gross production value.

4. The commodity accounts

These accounts also consist of two parts, viz. the supply side and the expenditure side. On the supply side we find the domestic producers, divided into the various producers within the healthcare sector (e.g. medical doctors, hospitals, pharmaceutical industry etc.) and other producers (outside the health sector), as well as imports. The expenditure side of the commodity accounts is split up into two major categories, viz. intermediary use and final expenditure. Final expenditure in turn is divided into private consumption, public consumption, investment, and exports.

Wherever possible we used the information available from the productions accounts, which was the case for health services and social services. When 'other producers' were encountered, they were attributed to the health sector according to the shares on the higher level of aggregation. A similar procedure was used for imports, which are, of course, very minor or almost non–existent with respect to the two service categories in question.

The computations of the commodity accounts for the remainder of the health sector, i. e. health industries and related trade were more complex. We followed similar procedures as afore–mentioned, using proportionality between lower and higher levels of aggregation (whenever detailed information was available for the latter). We also drew on other statistical sources (in addition to those mentioned, we used foreign trade statistics, production statistics, and the census of production units). Sometimes we had no other choice but to make plausible assumptions, where no compatible source of information could be tapped. As an example of the latter, we had to assume that a fixed percentage of a conglomerate category 'wholesale and retail trade in optical, photo and special mechanical equipment' would be attributed to medical use.

In certain instances we had 'hard' data on some components and then computed the remaining component as the difference or sum. An example: For the pharmaceutical industry we knew total expenditure and exports; based on the assumption that pharmaceutical output cannot be an investment good, the difference between total expenditure and exports would be attributed to consumption.

5. Sectorial interrelations: the input–output framework

Two dimensions were addressed in the analysis of interrelations between the health sector and the other sectors of the economy. First, the flows of intermediate goods between the sectors, which would indicate from which other sectors of the economy the intermediate input used in the health sector originated, and also into which sectors some of the output of the health sector went (then becoming intermediate input for these other sectors). And secondly, the multiplicative intermediate flows showing the total use of intermediate inputs by the producers of the health sector including second, third, etc. round effects²⁴.

The sources for deriving these interrelations are the so called ‘absorption matrices’ which are part of the full system of input–output tables. For the second exercise we needed the ‘matrix of cumulative input coefficients’²⁵.

Some of the aggregates of the detailed health sector could be taken directly from the published tables, some had to be computed on the basis of raw data or working tables that were again made available to us by Statistics Austria. And in certain cases, we once again had to proceed basically using analogies between an available higher–level aggregate and the required lower–level aggregate relevant for the health sector.

These efforts resulted in two types of tables, one showing the structure of the intermediate inputs (referring to production units!) and the other indicating the cumulative inputs into the production of the commodities (!) referring only to the final expenditure on commodities.

6. Employment in and for the health sector

The final major exercise of the studies referred to concerned employment. We were able to differentiate between employed and self–employed (with total employment being the sum of both) and also between direct employment in the health sector and indirect employment generated by the health sector in other sectors of the economy.

24 This is best illustrated by way of an example: the social service sector buys processed food from the food industry; this industry in turn buys produce from agriculture; agriculture buys inputs from the machinery sector etc. Thus the health sector (in general) or specifically the social service sector buys (indirectly) also from agriculture, machinery, etc.

25 This matrix is derived in a series of matrix operations from the absorption matrix, the make matrix, considering the gross production values of the production activities and the expenditures on domestic goods, all part of a full input–output system.

The bases for this latter computation were essentially the results of the input–output relations described in the previous section.

Employment data exist only on a two–digit industry level according to the above–mentioned ÖNACE (which in turn is fully compatible with the EU–wide NACE classification). Particularly in the health–related industries we had to go below the two–digit level. In these cases we computed the share of employment in, say, the share of the pharmaceutical industry in total employment in the chemical industry (the relevant two–digit industry) in proportion to the share of the pharmaceutical industry in the gross production value of the chemical industry. This assumption implies that the ratio of labour productivity between the pharmaceutical and the chemical industry remained unchanged – which does seem plausible. These computations resulted in direct employment in the health sector, detailed by the various subdivisions as listed in section 2. above.

Using the matrix of multiplicative input coefficients (see preceding section 5) we were able to compute an estimate of employment caused by the demand of the health sector in all other sectors of the economy, the so–called indirect employment. This is done in three steps: Firstly, compute for each ÖNACE two–digit industry the share of its total production value that goes to the health sector. Secondly, multiply this share by total employment in this two–digit industry. Thirdly, summation will yield total indirect employment generated by the health sector in all other sectors of the economy.

7. Computing time series: procedures for inter– and extrapolation

In the computation effected thus far we had established detailed accounts, input–output relations and employment, in principle, for 1983, 1990, and 1995, the years for which (among other information) input–output tables existed. ‘In principle’ because the year 1995 entailed a major disruption in the time series. Hence, the methodology described in this section refers explicitly to the period of 1981 – 1994, but could also be applied easily to other consistent time series.

The foundations for interpolation were the time series of the health quota (share of health expenditures in total GDP) and of GDP. Both series were available for 1981 – 1994. Other than just a simple linear interpolation or some other purely mathematical form of interpolation, we wanted to include the relevant ‘real’ economic developments, as represented by these two series. Where available we also included additional information, e. g. from annual trade statistics, or employment statistics.

The mathematical details of the process of interpolation (and also extrapolation) are contained in the Annex to this paper. Suffice it to say that we modify what is essentially a linear interpolation by allowing deviations from the linear trend in the series to be computed according to the development of the 'reference series' (e. g. the health quota), thus reflecting the 'real' annual developments as they occur by changes in the GDP and the share of health expenditures in the GDP.

8. Concluding remarks

To summarise, I would emphasise that in addition to exact calculations, a mixture of ingenuity and courage had to be employed in all instances of insufficient information, ultimately also using experience, outside expert information, judgement, and considerations of plausibility to try to arrive at the best possible estimates of production activities in the health sector.

One important aspect is the full documentation of the methods and procedures applied as well as the assumptions made at each and every step in order to ensure full transparency and thus the possibility to reproduce the results.

The new European-wide compatible classification schedules should make our task of comparative analyses somewhat easier, at least from 1995 onwards – thus we should perhaps concentrate on these years, relating back to the preceding years mostly for overall comparisons.

This note is meant to provide an overview (see title) and a basis for discussion at the important next meeting.²⁶ Detailed 'best' solutions will – despite large similarities in the broad categories – have to be found individually in every co-operating country, since the data situation will most certainly be different between countries at the level of more detailed analyses.

26 Being aware that in trying to be brief there may be more questions raised than answered, I would be glad to provide any further more detailed information on request.

Annex: Inter- and extrapolation

The objective is to transfer the path of a given time series onto a series to be created, for which only two points in time (reference points) are known.

Notation

k_0	=	starting value of the known time series
k_i	=	the i -th value of the known time series ($i=1, \dots, t$; t is the endpoint)
m_i	=	the i -th value of the series to be interpolated ($i=1, \dots, t-1$)
m_0, m_t	=	known values of the series to be interpolated
a_{ki}	=	slope of the known time series at point i ($i=0, \dots, t-1$)
a_{mi}	=	slope of the time series to be interpolated at point i ($i=0, \dots, t-1$)
a_k	=	total slope of the known time series
a_m	=	total slope of the time series to be interpolated

We know:

the average total slope of the known time series:

$$a_k = \frac{k_t - k_0}{t}$$

the slope of the known time series at each point i ($i=1, \dots, t$):

$$k_{i+1} = (i+1)a_{ki} + b_{ki}$$

$$k_i = ia_{ki} + b_{ki}$$

$$a_{ki} = k_{i+1} - k_i$$

and the average total slope of the time series to be interpolated:

$$a_m = \frac{m_t - m_0}{t}$$

Interpolation

To be computed are the unknowns m_i ($i=1, \dots, t-1$) of the time series to be interpolated which requires us to find the unknown slopes of the time series to be interpolated a_{mi} ($i=0, \dots, t-1$). We employ the (cautious) assumption of a linear trend for both series between the two reference points.

Interpolation is achieved through relating the deviations from the linear trend, i.e. the deviation of the slope from the (average) total slope, of the two series to each other:

$$a_{mi} - a_m = \alpha (a_{ki} - a_k)$$

α is (meaningfully) selected considering the ratio of the total slopes of the two series:

$$\alpha = \frac{|a_m|}{|a_k|}$$

Thus, the unknown slopes at point i become:

$$a_{mi} = a_m + \alpha (a_{ki} - a_k)$$

For any given m_i one can compute m_{i+1} as follows ($i=0, \dots, t-1$):

$$m_{i+1} = m_i + a_{mi}$$

Extrapolation

In principle, the same methodology can be applied to extrapolation. Because of the lack of a terminal point we assumed that both time series develop beyond the last known observation according to the same patterns as previously observed.

ANNEX 3: 'STRUCTURAL ANALYSIS OF THE AUSTRIAN HEALTH SECTOR – HEALTH AS A GROWTH FACTOR'

Paper presented on the occasion of an Austrian meeting of the 'Sub-Committee on Economics and Planning' (SCEP) of the 'Standing Committee of the Hospitals of the European Union' (HOPE) on 12 January 2002 in Bad Hofgastein

Structural Analysis of the Austrian Health System

Health as Growth Factor

Projects sponsored
by the
**Federal Ministry of Social Security
and Generations**

- Johann K. Brunner, Reiner Buchegger
- Marlies Dicklberger, Reli Mechtler, Klaus Stöger
- Department of Economics
- Institute for Health Systems Research
- Johannes Kepler University Linz

Health Structure, Bad Hofgastein, 2002 -01 -12

Goals of the studies

- Relevance of health sector for the economy
- Creation of a consistent time series
- Interactions with other sectors

Health Structure, Bad Hofgastein, 2002-01-12

OVERVIEW

- Objectives of the studies
- Approach and methodology
- Data: sources and problems
- Selected results

Health Structure, Bad Hofgastein, 2002-01-12

Health as growth factor

Expansion because of

increasing demand

for health services

Health Structure, Bad Hofgastein, 2002-01-12

OVERVIEW

- Objectives of the studies
- **Approach and methodology**
- Data: sources and problems
- Selected results

Health Structure, Bad Hofgastein, 2002 - 01-12

Definition of the health sector

1. Medical practitioners, general and specialists
2. Hospitals, subdivided in public, private non-profit, and private profit-oriented
3. Long-term care sector
4. Pharmaceutical industry
5. Medical devices industry
6. Medical-related trade, both wholesale and retail, relating to both industries above

Health Structure, Bad Hofgastein, 2002 - 01-12

Methodology

- Macroeconomic approach
 - National income accounting
- Sectoral interrelationships
 - Input-output analysis

Health Structure, Bad Hofgastein, 2002 - 01-12

Health goods and services

1. Health services (rendered essentially by doctors and hospitals, including therapy)
2. Long-term care
3. Pharmaceutical goods
4. Medical-devices goods
5. Trade services (wholesale and retail) related to the two groups of goods above

Health Structure, Bad Hofgastein, 2002 - 01-12

OVERVIEW

- Objectives of the studies
- Approach and methodology
- **Data: sources and problems**
- Selected results

Health Structure, Bad Hofgastein, 2002 - 01 - 12

Major data problems

- Insufficient details
 - GDP, I - O
- Incompatibilities between different sources
 - National income accounting, foreign trade statistics, production statistics, employment data
- Changes in systems and definitions
 - European System of National Accounts 1995
 - Production statistics (1995)
 - Market vs. non -market producers (1997)

Health Structure, Bad Hofgastein, 2002 - 01 - 12

Data

- National income accounts
 - 1981 – 1998
- Input -output tables
 - 1983, 1990, 1995
- Other statistics
 - foreign trade, census of manufacturing, production statistics, employment

Health Structure, Bad Hofgastein, 2002 - 01 - 12

OVERVIEW

- Objectives of the studies
- Approach and methodology
- Data: sources and problems
- **Selected results**

Health Structure, Bad Hofgastein, 2002 - 01 - 12

Health sector : production account 1998

	Billions of ATS	€
• Value added	194.0	14.1
– Employees' compensation	127.3	9.3
– Indirect taxation	3.1	0.2
– Gross surplus	63.6	4.6
• Intermediate inputs	96.8	7.0
• Gross production value	290.8	21.1
– Health services	171.4	12.5
– Long-term care	37.4	2.7
– Pharmaceutical products	25.0	1.8
– Medical-devices products	9.4	0.7
– Health-related trade services	36.6	2.7

Health Structure, Bad Hofgastein, 2002-01-12

Share of the health sector in the total economy

	1983	1998
• Value added	5.1 %	7.6 %
• Gross production value	4.0 %	6.1 %
• Average annual growth rate of value added, 1983 – 1998		8 %

(GDP -growth rate 5 %; both nominal)

Health Structure, Bad Hofgastein, 2002-01-12

ANNEX 4: 'A COMPARISON OF THE FRENCH AND AUSTRIAN HEALTH SYSTEMS – A MACROECONOMIC PERSPECTIVE'

Paper presented on the occasion of a meeting of the 'Sub-Committee on Economics and Planning' (SCEP) of the 'Standing Committee of the Hospitals of the European Union' (HOPE) on 4 October 2002 in Nicosia (Cyprus).

A Comparison of the French and Austrian Health System

A Macroeconomic Perspective

Methodology

- Macroeconomic approach
 - National income accounting
- (Sectoral interrelationships
 - Input-output analysis)

Nicosia, Oct. 4, 2002

Definition of Health Sector

1. Medical practitioners, general and specialists
2. Hospitals, subdivided in public, private non-profit, and private profit-oriented (Long-term care sector not included)
3. Pharmaceutical industry
4. Medical devices industry
5. Medical-related trade, both wholesale and retail relating to both industries above

Nicosia, Oct. 4, 2002

Growth Rates of Health Sector

1984 – 1993

• Average annual nominal growth rate of		
	France	Austria
• Value added	7.1 %	8.2 %
• Production value	7.4 %	8.0 %
• GDP	5.8 %	5.8 %
• Share of H.S. in GDP (1993)	6.2 %	5.4 %

Nicosia, Oct. 4, 2002

Share of Value Added in Production Value, 1993 (in %)

	France	Austria
Hospitals	73.5	71.3
priv.hosp.	67.4	65.4
publ.hosp.	74.9	71.6
Practitioners	73.4	79.5
Pharm. industr.	31.5	39.4
Med. dev. ind.	49.8	53.6
Med. Trade	78.9	72.6
Health Sector	66.0	68.6

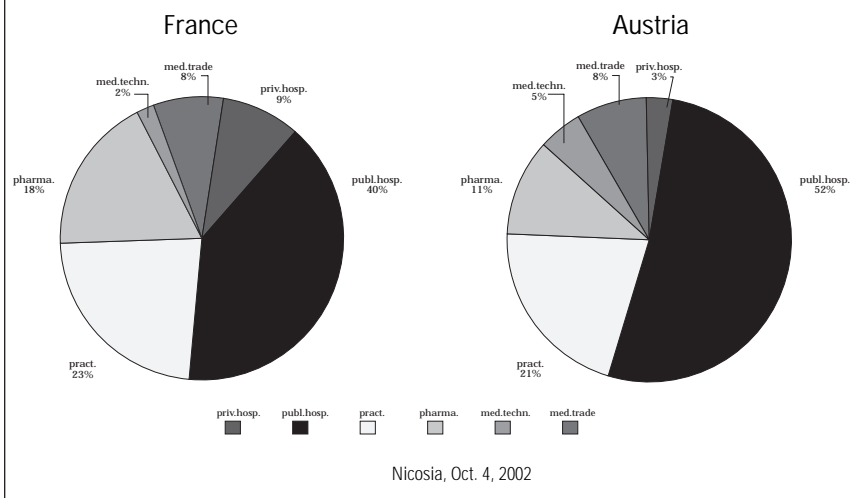
Nicosia, Oct. 4, 2002

Health Sector: Production Account 1993

	Billion of €	
	France	Austria
• Value added	67.0	8.3
• Intermediate inputs	34.5	3.8
• Production value	101.5	12.1
– Hospitals	49.0	6.7
– Medical practitioners	23.7	2.5
– Pharmaceutical industry	17.8	1.4
– Medical devices industry	2.4	0.6
– Health-related trade	8.6	0.9

Nicosia, Oct. 4, 2002

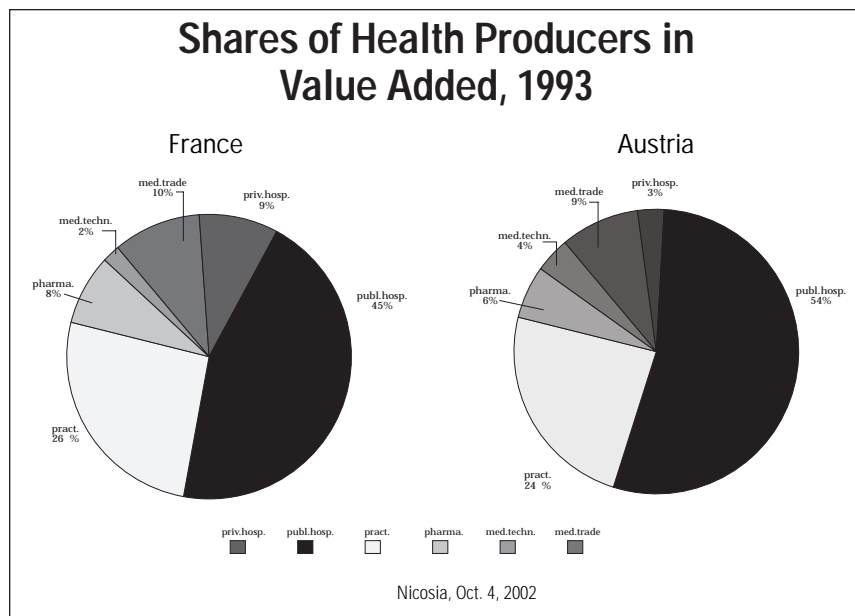
Shares of Health Producers in Production Value, 1993



ANNEX 5: THE PRODUCTION ACCOUNTS OF FRANCE AND AUSTRIA BY COMPARISON: VALUE ADDED, INTERMEDIATE CONSUMPTION, PRODUCTION VALUE, 1984 – 1993

The sources of the following tables are Bocognano & Raffy-Pihan 1997 for France and Brunner et al. 2001 for Austria.

Shares of Health Producers in Value Added, 1993



	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	27.257	29.127	31.105	32.912	34.693	37.456	40.202	42.501	46.003	48.968
thereof: private hospitals	4.183	4.697	5.246	5.673	6.173	6.620	7.068	7.444	8.618	9.121
public hospitals	23.074	24.430	25.859	27.239	28.519	30.837	33.133	35.057	37.385	39.847
Practitioners, general and specialists	12.848	14.254	16.136	17.089	18.389	20.227	20.893	21.430	22.738	23.687
Pharmaceutical industry	8.092	9.226	10.058	10.822	12.309	13.547	14.536	15.784	16.802	17.833
Medical devices industry	1.171	1.288	1.465	1.522	1.698	1.914	2.165	2.335	2.376	2.424
Medical trade	4.147	4.582	5.005	5.392	6.026	6.784	7.331	7.326	8.389	8.581
Aggregate public health system	53.515	58.477	63.770	67.738	73.113	79.928	85.126	89.376	96.308	101.493

Table A 5.1
FRANCE: Production Value (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	27.257	29.127	31.105	32.912	34.693	37.456	40.202	42.501	46.003	48.968
thereof: private hospitals	4.183	4.697	5.246	5.673	6.173	6.620	7.068	7.444	8.618	9.121
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Aggregate public health system	53.515	58.477	63.770	67.738	73.113	79.928	85.126	89.376	96.308	101.493

Table A 5.2
FRANCE: Production (Distr.) (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	27.257	29.127	31.105	32.912	34.693	37.456	40.202	42.501	46.003	48.968
thereof: private hospitals	4.183	4.697	5.246	5.673	6.173	6.620	7.068	7.444	8.618	9.121
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Medical trade	4.147	4.582	5.005	5.392	6.026	6.784	7.331	7.326	8.389	8.581
Aggregate public health system	53.515	58.477	63.770	67.738	73.113	79.928	85.126	89.376	96.308	101.493

	661	761	1661	0661	6861	8861	1861	9861	5861	861	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Medical trade	8.1%	8.2%	8.3%	8.4%	8.3%	8.3%	8.4%	8.5%	8.9%	8.8%	Medical trade
Medical devices industry	7.4%	5.8%	5.6%	5.0%	5.2%	5.9%	6.0%	6.1%	6.1%	5.5%	Medical devices industry
Pharmaceutical industry	11.3%	12.2%	12.3%	11.8%	11.8%	11.1%	11.1%	10.7%	10.9%	6.6%	Pharmaceutical industry
Practitioners, general and specialists	20.5%	21.2%	22.5%	23.1%	22.8%	23.2%	23.2%	22.7%	22.5%	20.9%	Practitioners, general and specialists
public hospitals	12.1%	10.5%	9.9%	9.3%	9.4%	9.9%	9.8%	9.3%	9.7%	9.7%	public hospitals
thereof: private hospitals	3.2%	9.9%	9.5%	9.5%	9.9%	9.4%	9.7%	9.2%	9.0%	9.1%	thereof: private hospitals
Hospitals	55.3%	53.4%	47.1%	48.1%	49.1%	47.0%	46.0%	45.0%	49.4%	47.4%	Hospitals

Table A 5.3
Austria: Production Value (Distribution)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Aggregate public health system	6.032	6.583	7.115	7.547	8.087	8.838	9.340	10.113	11.179	12.053
Hospitals	2.999	3.259	3.594	3.843	4.102	4.587	4.837	5.195	5.972	6.669
thereof: private hospitals	0.113	0.129	0.158	0.177	0.191	0.227	0.232	0.252	0.321	0.389
public hospitals	2.887	3.130	3.436	3.666	3.910	4.360	4.604	4.943	5.650	6.281
Practitioners, general and specialists	1.571	1.657	1.725	1.784	1.882	2.015	2.154	2.274	2.398	2.474
Pharmaceutical industry	0.599	0.697	0.760	0.837	0.952	1.040	1.098	1.243	1.247	1.360
Medical devices industry	0.334	0.404	0.434	0.450	0.480	0.462	0.468	0.565	0.646	0.571
Medical trade	0.529	0.566	0.602	0.632	0.672	0.733	0.782	0.837	0.916	0.979

Table A 5.9
FRANCE: Intermediate Consumption (Distribution)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Medical trade	5.2%	5.4%	4.9%	4.9%	4.3%	4.3%	4.5%	4.8%		
Medical devices industry	3.5%	3.7%	3.9%	3.5%	3.3%	3.3%	3.1%	3.0%		
Pharmaceutical industry	35.4%	35.2%	35.0%	34.9%	35.0%	33.5%	33.0%	32.4%		
Practitioners, general and specialists	18.3%	18.7%	18.8%	19.4%	19.4%	19.8%	18.8%	18.7%		
public hospitals	29.0%	28.3%	29.3%	29.2%	30.1%	29.1%	33.5%	34.3%		
thereof: private hospitals	8.6%	8.8%	8.2%	8.0%	9.9%	7.7%	9.6%	9.8%		
Hospitals	37.6%	37.1%	37.5%	37.0%	38.0%	39.2%	39.8%	40.4%	41.1%	

Table A 5.5
FRANCE: Intermediate Consumption (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	7.195	7.805	8.292	8.747	9.305	9.974	10.784	11.514	12.251	12.971
thereof: private hospitals	1.187	1.333	1.518	1.709	1.926	2.114	2.325	2.523	2.904	2.971
public hospitals	6.008	6.472	6.774	7.038	7.379	7.860	8.459	8.991	9.347	10.000
Practitioners, general and specialists	3.270	3.624	4.074	4.406	4.747	5.220	5.623	5.778	6.168	6.308
Pharmaceutical industry	5.670	6.417	6.867	7.470	8.557	9.441	10.028	10.746	11.641	12.223
Medical devices industry	0.532	0.593	0.677	0.704	0.811	0.950	1.116	1.194	1.211	1.217
Medical trade	0.838	0.871	0.899	0.959	1.055	1.347	1.427	1.498	1.789	1.808
Aggregate public health system	17.505	19.310	20.810	22.286	24.476	26.932	28.978	30.730	33.060	34.527

Table A 5.8
AUSTRIA: Intermediate Consumption (Distribution)

	1961	2961	1661	9901	6861	8861	2861	9861	5861	9861
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Medical trade	7.1%	6.9%	6.7%	6.9%	6.8%	6.7%	6.9%	6.7%	6.7%	6.8%
Medical devices industry	7.0%	8.9%	8.1%	7.0%	7.4%	8.7%	8.7%	9.1%	8.5%	9.7%
Pharmaceutical industry	21.8%	21.4%	22.9%	22.4%	22.3%	22.0%	22.2%	21.1%	21.5%	20.8%
Practitioners, general and specialists	13.4%	14.1%	15.1%	15.7%	15.5%	15.9%	16.0%	16.7%	16.7%	18.5%
thereof: private hospitals	47.1%	45.6%	44.5%	45.3%	45.1%	44.1%	43.8%	40.0%	43.9%	33.4%
thereof: public hospitals	3.6%	3.2%	2.7%	2.8%	2.8%	2.6%	2.9%	2.4%	2.1%	2.0%
Hospitals	50.7%	48.7%	47.2%	48.0%	49.1%	47.9%	47.9%	46.9%	45.7%	46.9%

Table A 5.7
AUSTRIA: Intermediate Consumption (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	0.905	0.991	1.053	1.113	1.195	1.358	1.430	1.525	1.730	1.917
thereof: private hospitals	0.040	0.046	0.055	0.061	0.067	0.080	0.082	0.089	0.112	0.134
public hospitals	0.865	0.945	0.998	1.051	1.128	1.277	1.348	1.436	1.618	1.783
Practitioners, general and specialists	0.361	0.382	0.378	0.383	0.406	0.439	0.469	0.488	0.500	0.506
Pharmaceutical industry	0.407	0.466	0.478	0.534	0.564	0.632	0.667	0.739	0.759	0.825
Medical devices industry	0.149	0.185	0.206	0.209	0.222	0.210	0.208	0.261	0.316	0.265
Medical trade	0.133	0.144	0.152	0.160	0.171	0.194	0.205	0.218	0.244	0.268
Aggregate public health system	1.955	2.168	2.267	2.399	2.558	2.832	2.977	3.231	3.550	3.781

	1961	1961	1961	1961	1961	1961	1961	1961	1961	1961	1961	1961
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Medical trade	10.1%	10.4%	9.9%	10.5%	10.3%	10.2%	9.8%	9.9%	9.5%	9.2%		
Medical devices industry	1.8%	1.8%	1.9%	1.9%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%		
Pharmaceutical industry	8.4%	8.2%	8.9%	8.0%	7.7%	7.7%	7.7%	7.7%	7.7%	7.9%		
Practitioners, general and specialists	26.0%	27.9%	26.7%	27.2%	28.3%	28.0%	26.7%	28.2%	28.1%	29.9%		
public hospitals	44.6%	44.3%	44.4%	43.9%	43.4%	43.5%	44.4%	44.4%	48.5%	47.4%		
thereof: private hospitals	2%	6%	8%	8%	5.8%	7.8%	7.8%	7.8%	9.8%	8%		
private hospitals	53.8%	53.4%	52.8%	52.4%	49.1%	47.2%	47.2%	47.5%	47.9%	47.5%		

Table 21.5 A (Distribution) **Value Added** **FRANCE:**

Table A.5.11
FRANCE: Value Added (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	20,062	21,322	22,813	24,165	25,387	27,482	29,417	30,987	33,752	35,998
thereof: private hospitals	2,997	3,365	3,728	3,964	4,247	4,506	4,744	4,921	5,713	6,150
public hospitals	17,065	17,958	19,085	20,201	21,141	22,976	24,674	26,066	28,038	29,847
Practitioners, general and specialists	9,578	10,630	12,062	12,683	13,641	15,007	15,270	15,652	16,571	17,378
Pharmaceutical industry	2,422	2,809	3,191	3,352	3,751	4,106	4,508	5,038	5,161	5,610
Medical devices industry	0,640	0,695	0,788	0,818	0,886	0,964	1,049	1,141	1,165	1,207
Medical trade	3,308	3,711	4,105	4,433	4,971	5,437	5,904	5,828	6,600	6,773
Total	36,010	39,168	42,960	45,451	48,637	52,996	56,148	58,646	63,248	66,966

	1961	1966	1971	1976	1981	1986	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	Total
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Medical trade	8.9%	8.8%	9.0%	9.1%	9.6%	10.6%	11.6%	12.6%	13.6%	14.6%	15.6%	16.6%	17.6%	18.6%	19.6%	20.6%	16.6%
Medical devices industry	3.7%	4.3%	4.4%	4.1%	4.2%	4.7%	4.7%	4.7%	4.7%	4.9%	5.1%	5.3%	5.5%	5.7%	5.9%	6.1%	5.5%
Pharmaceutical industry	5.5%	4.9%	4.3%	3.8%	3.9%	4.0%	4.0%	4.0%	4.0%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
Practitioners, general and specialists	23.8%	29.6%	26.0%	25.9%	27.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%	26.9%
public hospitals	54.4%	52.9%	51.0%	51.2%	51.3%	50.9%	50.8%	50.3%	50.3%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%
thereof: private hospitals	1.3%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
Hospitals	4.7%	5.5%	5.3%	5.5%	5.8%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%

Table A 5.13
AUSTRIA: Value Added (in billions of €)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	2.094	2.268	2.541	2.730	2.907	3.229	3.407	3.670	4.241	4.752
thereof: private hospitals	0.073	0.083	0.103	0.116	0.125	0.146	0.150	0.163	0.209	0.254
public hospitals	2.021	2.185	2.438	2.614	2.782	3.083	3.257	3.507	4.032	4.498
Practitioners, general and specialists	1.210	1.275	1.347	1.401	1.476	1.576	1.686	1.786	1.898	1.968
Pharmaceutical industry	0.192	0.232	0.282	0.304	0.389	0.408	0.432	0.503	0.488	0.535
Medical devices industry	0.185	0.218	0.228	0.241	0.258	0.253	0.261	0.304	0.330	0.306
Medical trade	0.397	0.421	0.450	0.472	0.500	0.539	0.578	0.619	0.672	0.711
Total	4.077	4.415	4.847	5.148	5.530	6.006	6.362	6.883	7.629	8.272

	1961	1966	1971	1976	1981	1986	1991	1996	2001	2006	2011	2016
Aggregate public health system	68.6%	68.2%	68.1%	68.1%	68.0%	68.4%	68.2%	68.1%	67.1%	67.9%	67.9%	68.6%
Medical trade	72.6%	73.3%	74.0%	73.9%	73.6%	74.7%	74.8%	75.4%	75.4%	75.4%	75.4%	76.9%
Medical devices industry	53.6%	51.0%	53.8%	55.6%	54.7%	53.7%	53.5%	52.4%	54.1%	55.3%	55.3%	56.9%
Pharmaceutical industry	39.4%	39.1%	40.5%	39.3%	39.3%	40.8%	40.3%	41.7%	42.3%	42.3%	42.3%	43.8%
Practitioners, general and specialists	70.5%	71.6%	78.9%	78.2%	78.2%	78.4%	78.5%	78.1%	78.0%	78.0%	78.0%	78.5%
public hospitals	61.6%	61.4%	70.9%	70.7%	70.7%	71.1%	71.3%	71.0%	70.8%	70.0%	70.0%	70.5%
thereof: private hospitals	45.4%	45.2%	49.9%	49.9%	49.9%	52.5%	51.5%	52.4%	52.4%	52.4%	52.4%	52.9%
Hospitals	61.3%	61.0%	70.0%	70.4%	70.4%	70.0%	70.0%	69.7%	69.9%	69.9%	69.9%	70.4%

Table 5.15 AUSTRIA: Value Added (Share in PV)

Table A.5.15 FRANCE: Value Added (Share in PV)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hospitals	73.6%	73.2%	73.3%	73.4%	73.2%	73.4%	73.2%	73.4%	73.4%	73.5%
thereof: private hospitals	71.6%	71.6%	71.1%	69.9%	68.8%	68.1%	67.1%	66.1%	66.3%	67.4%
public hospitals	74.0%	73.5%	73.8%	74.2%	74.1%	74.5%	74.5%	74.4%	75.0%	74.9%
Practitioners, general and specialists	74.5%	74.6%	74.8%	74.2%	74.2%	74.2%	73.1%	73.0%	72.9%	73.4%
Pharmaceutical industry	29.9%	30.4%	31.7%	31.0%	30.5%	30.3%	31.0%	31.9%	30.7%	31.5%
Medical devices industry	54.6%	54.0%	53.8%	53.8%	52.2%	50.4%	48.4%	48.9%	49.0%	49.8%
Medical trade	79.8%	81.0%	82.0%	82.2%	82.5%	80.1%	80.5%	79.5%	78.7%	78.9%
Aggregate public health system	67.3%	67.0%	67.4%	67.1%	66.5%	66.3%	66.0%	65.6%	65.7%	66.0%

ANNEX 6: VALUE ADDED, INTERMEDIATE CONSUMPTION, PRODUCTION VALUE, EMPLOYMENT FOR GERMANY, 1994

	Value Added		Intermediate Consumption		Production Value	
	in billions of €	%	in billions of €	%	in billions of €	%
Hospitals	35.02	71.9	13.66	28.1	48.68	100
%	47.2		26.5		38.7	
Practitioners, general and specialists	26.35	69.3	11.65	30.7	38.00	100
%	35.5		22.6		30.2	
Pharmaceutical industry	7.04	40.9	10.17	59.1	17.21	100
%	9.5	19.7	13.7			
Medical devices industry	2.71	48.2	2.91	51.8	5.62	100
%	3.6		5.7		4.5	
Pharmacies	3.12	19.2	13.14	80.8	16.26	100
%	4.2		25.5		12.9	
Total	74.24	59.0	51.53	41.0	125.77	100
%	100		100		100	
Health Service Providers	61.37	70.8	25.31	29.2	86.68	100
%	82.7		49.1		68.9	
Health Industry	12.87	32.9	26.22	67.1	39.09	100
%	17.3		50.9		31.1	
Employment	1.96 millions ('Health professions', Federal Statistical Office) 4.2 millions (direct and indirect, Council of Experts for concerted action in the public health system)					

Source: GÖPFFAHR T & MILBRANDT 1997; own computations.

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FEDERAL MINISTRY OF
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