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Boris Augurzky, Dirk Engel, Sebastian Krolop,
Christoph M. Schmidt and Stefan Terkatz

Hospital Rating Report 2006

Approaches to the Sustainable Financing of Patient Care and Treatment – Development of German Hospitals up to 2010

Heft 33

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Unternehmensberatung Health Care

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Preamble

Health expenditures in Germany – as in almost all industrialized countries – grow more rapidly than the gross domestic product. Since a large portion of German health expenditures is financed by non-voluntary health premiums proportional to personal wages and collected by social health insurances, rising expenditures mean rising non-wage labor costs. This might trigger a vicious circle of rising non-wage labor costs and, as a consequence, rising unemployment which, in turn, reduces the number of payers to the social health insurances. To limit growth of health expenditures, German politics implemented budget constraints for some health care providers, especially for hospitals. Therefore, hospitals are under considerable strain to reduce their costs. Due to the demographic aging process and technical progress in health care, which tend to increase demand for health care services, expenditures are expected to rise above average while contributions to social health insurance remain constant at best.

Given this situation it is of great importance to know more about the economic situation of German hospitals which have a market share in the health market of approximately 25% or roughly 60 billion euros in 2004. Therefore, we decided to update our first *Hospital Rating Report*, a joint work published by the Rheinisch-Westfälisches Institut für Wirtschaftsforschung Essen (RWI Essen) and the ADMED Health Care Consultancy. For this purpose we collected 277 annual financial statements of 347 hospitals for various years and additional information on their medical output.

We aim at increasing the transparency in the German health system in order to improve the basis for decision makers in politics, for potential investors in the German health system, and for hospitals and their business partners. We calculate balance sheet ratings and probabilities of default for hospitals in a way similar to banks conducting credit ratings for their clients. This gives a good impression of the financial stability of German hospitals. Basically, we would be able to name the hospitals and their ratings. However, we decided against doing so because balance sheet rating is only part of a full rating process – though a very important one. Instead, we compare ratings across selected sub-

groups of German hospitals and build financial forecasts up to 2010. The next edition of the *Hospital Rating Report*, to be published in January 2007, will additionally contain benchmarking data of selected subgroups and considerably more regional aspects of the results given in this report.

We thank Dr. Michaela Lemm, Joachim Schmidt and Christoph Schwierz for valuable comments and helpful suggestions, Karl-Heinz Herlitschke for dedicated support in data analysis, and Marlies Tepaß for organizational assistance. We particularly thank Hendrik Schmitz who intensively helped us building up this huge data set and extensive model and who constantly challenged our analyses and results. Of course, the authors themselves take full responsibility for the whole content and possible errors. Critical comments by the readers are welcome to successively improve this report in the future.

Essen, Köln, January 2007

Dr. Boris Augurzky, Dr. Dirk Engel, Dr. Sebastian Krolop,
Prof. Dr. Christoph M. Schmidt, Ph.D., Dr. Stefan Terkatz

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Executive Summary

Objectives and Content of the Study

There are reports about German hospitals almost every day in the media. We read about unacceptable conditions for patients and staff, huge deficits, doctors protesting on the streets, university hospitals being privatized, public-sector hospitals forming associations and health insurance schemes merging. There are continual disagreements between the associations which represent doctors working within the public health system, patients are dissatisfied and feel that their treatment is at risk. This is the gloomy picture of a health system on which we spend € 240 billion each year, a figure that roughly corresponds to the gross domestic product of Austria. Nevertheless, there are also reports of promising developments in the health sector. A publicly quoted company paid about € 1.5 billion for a private hospital chain in 2005. The current market leader in the private hospital sector aims to triple its turnover in the next few years. At first glance, these reports paint a contradictory picture. On the one hand, there are considerable doubts concerning the sustainability of our health system; on the other hand, investors see considerable potential in this sector.

In this study, we demonstrate that this is in fact no contradiction at all but that there is considerable variation in the economic position of hospitals. We investigate the current economic situation in the hospital sector, make predictions concerning the future situation and show how inpatient treatment for patients in Germany can be made more efficient and sustainable. A key parameter in our investigations is the rating or the probability of default (PD), i.e. the probability that a hospital could default on its obligations or become insolvent within one year. This is used as a measure of the creditworthiness of a hospital, a factor that has become increasingly important since the introduction of

Basel II. For this purpose, we use a database with the annual financial data and medical information of 347 hospitals. The study is intended for decision-makers in politics, health insurance schemes and associations, the business partners and investors of hospitals as well as for hospital management and supervisory bodies.

Future PD values are assessed on the basis of five scenarios (1 to 5):

– Scenario 1: Convergence of DRG flat rates by 2009
The convergence of DRG (diagnosis-related group) flat rates will lead to a levelling of the remuneration levels of hospitals within a federal state. Currently, each hospital charges a different DRG flat rate for the same service. By 2009, there will only be one DRG flat rate for comparable services within each federal state. As a result, revenues will fall at some hospitals and rise at others.

– Scenario 2: Demand for hospital services at the district level
In combination with the structure of specialist departments at a hospital, demographic developments at the district level may lead to a rise or fall in the demand for hospital services. For Germany as a whole, it is estimated that demand will rise by 4% by 2010. However, in view of the present cap on hospital budgets, which will remain in place over the next few years, it is not expected that hospital revenues will keep pace with this development. At the same time, costs will rise as a result of the increase in the number of cases.

– Scenario 3: Reduction in public funding
Public subsidies paid under the *Krankenhausfinanzierungsgesetz* (Hospital Financing Act) of 1972 to finance investments have been falling for many years. We expect that public funding will continue to fall by 5% per year in real terms in the future.

– Scenario 4: Increased use of outpatient potential
On the basis of the principle “outpatient before inpatient”, health insurers are increasingly considering the outpatient potential of services that have previously been provided only to inpatients. This trend will lead to a shift in services towards the outpatient sector and a reduction in revenues from the inpatient sector. Even if hospitals are in a position to provide such outpatient services themselves, the rise in outpatient revenue will be insufficient to compensate for the fall in the inpatient sector and hospital revenue as a whole is expected to fall.

– Scenario 5: Staff costs
As a result of a growing shortage of medical and nursing personnel, we expect growth in staff costs to be in excess of the budget increases.

Results

65% of the hospitals in the database have a DRG base rate below and only 35% have a rate above the state average. However, hospitals with below-average rates have revenues of € 5.5 billion, whereas those with above-average rates account for € 6.7 billion. The average PD value calculated is 1.7% and the average hospital is in the "amber zone". Neglecting size difference between hospitals, the average value of 1.7% calculated will remain virtually unchanged until 2010. However, if the individual hospitals are weighted by revenues, the average PD value will deteriorate to about 2.2% by 2010. Taking demographic developments into consideration, there is likely to be a further increase in PD values by 2010. It is also expected that the reduction in public funding will not have a favorable impact compared with the basic scenario. However, this factor will only lead to a slight increase in the average PD up to 2010.

Further emphasis on outpatient treatment will have considerably greater adverse impact on hospitals, at least in the medium term. Even a shift of only 5% from inpatient to outpatient revenue over the next five years would result in a rise in the average PD to 2.8% by 2010. The effect of rising staff costs is similar. If all the scenarios considered were to coincide, the situation would become alarming. On this basis, the average hospital would reach the "red zone" by 2008 and the average PD would rise as high as 4.0% by 2010.

Nevertheless, the distribution of ratings in the basic scenario shows that 66% of hospitals are in the green, 14% in the amber and 20% in the red zone. DRG convergence will only change this situation very slightly. However, weighted according to their sizes, almost 29% of hospitals will reach the red zone by the end of the convergence phase while the green zone will shrink to 55%.

Private hospitals and those which are operated by non-governmental charitable organizations show a significantly better rating than those which are operated as public bodies. The rating of private hospitals is only slightly better than for those operated by charitable organizations. For methodological reasons, we were unable to include the large private hospital chains in our study. Apart from more efficient services, lower staff costs account for a large part of the difference between private and public hospitals. However, as private hospitals tend to have higher base rates than charitable or public hospitals, the good ratings presently enjoyed by private institutions are expected to deteriorate slightly by 2010.

Hospitals in Eastern Germany have a significantly lower PD than those in Western Germany. Up to 2010, typical hospitals in rural areas[1] will also have a significant edge over hospitals in urban agglomerations. The fact that a hos-

[1] This also includes hospitals in towns with rural surroundings.

pital is part of a chain significantly improves its rating. Hospitals operating within a group probably benefit from synergy effects. The larger the hospital, the better is its current rating. Larger hospitals can apparently operate more economically, distributing fixed costs over a wider base and benefiting from economies of scale. However, the size effect is significantly less pronounced above 1,000 beds. On the basis of our calculations, large hospitals will also be adversely affected by convergence because they have a higher base rate.

As a general principle, a higher base rate currently results in a better rating. This may indicate that hospitals with higher base rates have been more successful in negotiations with health insurers in the past. However, this apparent link between base rate and rating will disappear completely in the course of convergence. Hospitals with a high base rate get off to a relatively good start, with a PD of 1.3%. By the end of the convergence phase, they will reach the red zone, with a PD as high as 3.5%. The number of establishments in the red zone will reach 40%, while the number in the green zone will shrink to 35%. The hospitals concerned will need to make drastic adjustments. On the other hand, hospitals with lower base rates will make a poorer start, but will move relatively swiftly into the green zone and will only have a PD of 0.6% by 2010. The number in the red zone will shrink to the almost negligible figure of 5%.

Population growth in the district of a hospital in the past leads to a better current rating. However, the number of older people in an area does not have an effect on the PD of a hospital. The amount of special items on a hospital's balance sheet also has no impact on the PD.

Implications and recommendations for action

DRG convergence will achieve its objectives, leading to a moderate redistribution of resources, about 2.7% of the overall budget, within the hospital sector. The objective is to ensure the same charge for the same service. Nevertheless, prices should be deregulated in the long term in order to account for local fluctuations in supply and demand, especially supply bottlenecks.

Convergence within the federal states must be rapidly followed by national convergence. If national convergence only starts after 2010, the result will be a distortion of the sector. Some of the „losers" in convergence at the level of the state could prove to be "winner" in national convergence. In extreme cases, a hospital could be forced to close for economic reasons before the start of the national convergence process and would no longer be in a position to benefit. On the other hand, hospitals which had benefited from convergence within their states could be adversely affected by national convergence. If for political reasons national convergence is considered before prices are deregulated, we are of the opinion that national convergence should start as soon as

possible, before 2009, indeed before convergence at the state level is completed.

Market consolidation will improve system efficiency. The disappearance of about 10% of hospitals by 2010 will make the hospital sector more efficient. This is a normal, even important process in a market economy which must continuously reorient itself and find optimum structures in a changing environment. In emergency and catastrophe medicine too, the use of scarce resources is clearly governed by *triage*, a process which focuses treatment capacities on those patient groups whose prospects of survival are most likely to be improved by treatment. The average PD without the worst 10% of hospitals[2] would only be about 1.35% in 2010. The system as a whole would benefit because the patients transferred could be treated more economically in the 90% of hospitals remaining. On the basis of our calculations, costs in the hospital sector could be reduced by a total of € 3.3 billion. In addition, excess capacities could be reduced. We estimate that market consolidation could lead to the elimination of about 59,000, or 12%, of the 500,000 beds currently available in general hospitals.

Market consolidation would facilitate a monistic approach to hospital financing and reduce the burden on the public purse. The current "dualistic" model of hospital financing cannot be justified from an economic point of view. A conversion to monistic financing is currently impossible because the funds made available by the federal states for investment would then have to be provided by the health insurance schemes. However, an increase in health insurance contributions would not be possible because of the economic situation in Germany. If consistent market consolidation were to be permitted, the funding required could be reduced by € 3.3 billion by 2010. The funds released in this process could then be used to include public investment subsidies, currently running at about € 3 billion per year, in the DRG financing system. This would be a decisive step towards greater responsibility for resources and more leeway for hospitals. In addition, the state would no longer have to bear investment subsidies totalling about € 3 billion per year and to absorb the deficits of uneconomical hospitals. The total saving to the state would be of the order of € 4.5 billion per year.

The security of services is not at risk. Since hospital closures would be based mainly on economic criteria, not on service criteria, problems with service availability could arise. The regulation of the hospital sector means that prices cannot adjust to local supply and demand conditions, allowing the market to

2 For this purpose, the 10% of worst hospitals are considered to be those with the highest PD at the end of the convergence phase. As PD values are only a measure of statistical probability, it is also possible that a hospital with a low PD will fail. A more detailed analysis of this factor would be beyond the scope of this study.

resolve service bottlenecks. However, we consider that this risk is less serious than frequently assumed. Our calculations indicate that the PD in rural districts is lower than in agglomerations. We therefore expect the reduction in numbers of rural hospitals to be less severe. Nevertheless, the risks of service supply bottlenecks could be reduced if rural hospitals redefined their roles, for example as "gateway hospitals" in a hospital group.

More freedom for hospitals. The introduction of a monistic financing system would ensure greater freedom for individual hospitals. However, the deregulation of the price system and the elimination of budget capping would need to be combined with a functioning brake on demand within the system. Increases in contributions to statutory health schemes must be prevented in the present economic situation. The most effective brake on demand would be to give patients greater responsibility. For example a reference price system of the type currently used for medicines could be introduced.

Outpatient operations blur distinction between specialists in and outside hospitals. Where outpatient operations are possible without sacrificing quality, they should be preferred for cost reasons. However, this poses a risk for hospitals that operations could move from the hospital sector to practicing physicians. Conditions must be defined to ensure fair competition at this interface. In our opinion, the distinction between specialists in and outside hospitals should be eliminated.

Public hospitals are set to lose their dominant position. On the basis of the PD values calculated and the further privatization of public hospitals that is expected, we assume that the share of public hospitals will be continuously reduced. If the privatization rate up to 2010 is 2% per year, there will be just as many public as private hospitals by 2010. With reference to the number of beds, the share of public hospitals will probably fall from 53% to 45%.

Cost pressures will increase. In our opinion, there are two main factors which will lead to rising costs. First, demographic developments will fuel rising demand for hospital services, resulting in higher costs, but not in higher revenues as budgets will remain capped. Secondly, staff costs will exert higher pressure. Staff costs account for almost two-thirds of the total cost of hospital operation. The growing shortage of medical practitioners will lead to increased competition for good doctors. It is therefore only a question of time before salaries start to rise.

Hospitals must tap their efficiency reserves. All these factors clearly show that the economic situation of some hospitals is likely to become critical or even disastrous in the DRG convergence phase. There will also be no additional public financing. Any additional funds will need to come from the private sector. There is therefore no alternative to enhanced efficiency within the hos-

pital sector itself, both in the commercial and in the medical area. This process must be reinforced by greater freedom for hospitals.

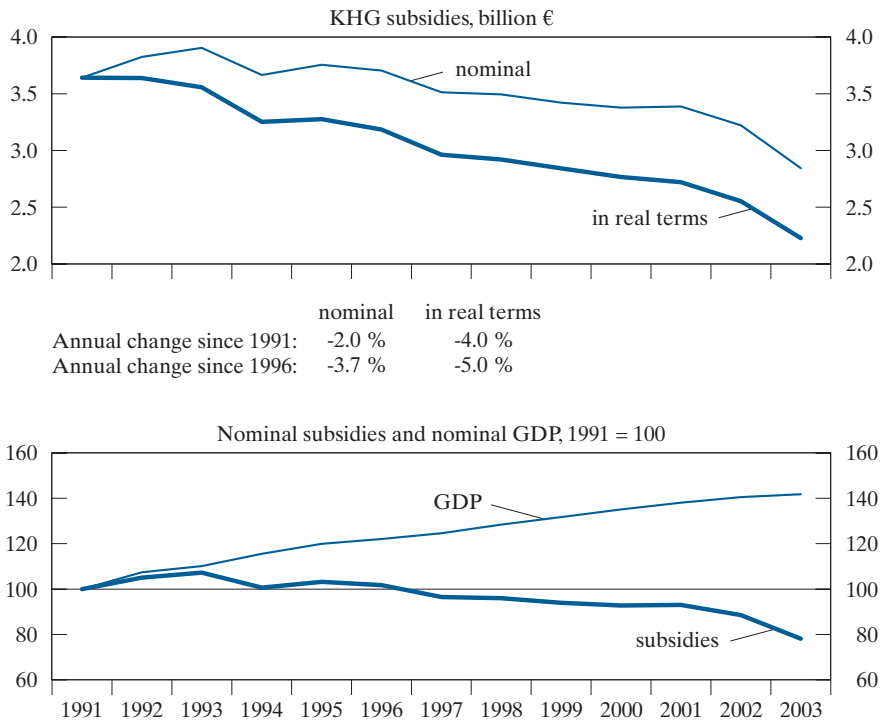
1. Background and Objectives of the Rating Report

The new hospital payment system based on DRG flat rates (details of the operation of this system are given in the Appendix) has now become reality. The DRG convergence phase, heralding a new era for hospitals, started officially in 2005. By the end of 2009, all the hospitals within a German federal state will be working with the same price system for the first time. As a result, the figures available will ensure system transparency and data quality that are unprecedented in the hospital sector, although they will still not reach the transparency of other sectors. The benefits are evident. Patients will be able to inform themselves more thoroughly, competition between hospitals will grow, management will have more effective control possibilities and researchers will also benefit from the improved data which will be available.

Nevertheless, this will still be a state-regulated price system. The convergence of prices will pose severe challenges for many hospitals. Those which currently have a price level above the average in their state will face cuts in revenues up to 2009. In view of the generally low return on sales, the hospitals concerned will be forced to conduct a critical review of their organizational structures and procedures and to adapt their costs in order to ensure survival. Not all hospitals will succeed in these endeavors. Hospitals which start too late or have structures which cannot be changed will disappear from the market. However, Hospitals with price levels below the average in their states will experience growing revenues and have an opportunity to solve persistent problems and to finance at least part of the investments required from their own resources.

DRG convergence is a redistribution of resources within the system on the basis of the principle of comparable remuneration for comparable services. In future, hospitals will receive the same remuneration for comparable services, at least within the same state. However, no new resources will be made available to the system – unless there is an increase in the demand for private health services. In all probability, there will be no increase in the funds available from statutory health schemes in view of the overall economic situation. As a result of high unemployment, the revenues of the statutory health schemes will stagnate. Demographic change is expected to bring a fall in the number of persons employed, further reducing the contributions paid. At the same time, the growth in the number of older people will lead to higher expenditure. If, unexpectedly, additional funds do become available, they will very probably flow into the nursing care sector. The nursing care insurance scheme already has expenditure in excess of its revenues in 2005 and will have depleted its capital reserves in the very near future. However, the "nursing care boom", which will call for more and more funds, has not yet started. At any rate, it appears very unlikely that the hospital sector can expect increased contributions from social insurance schemes.

Figure 1
The state is cutting back its role in the financing of investments
1991 to 2003



Analysis by ADMED and RWI Essen. Mörsch (2004).

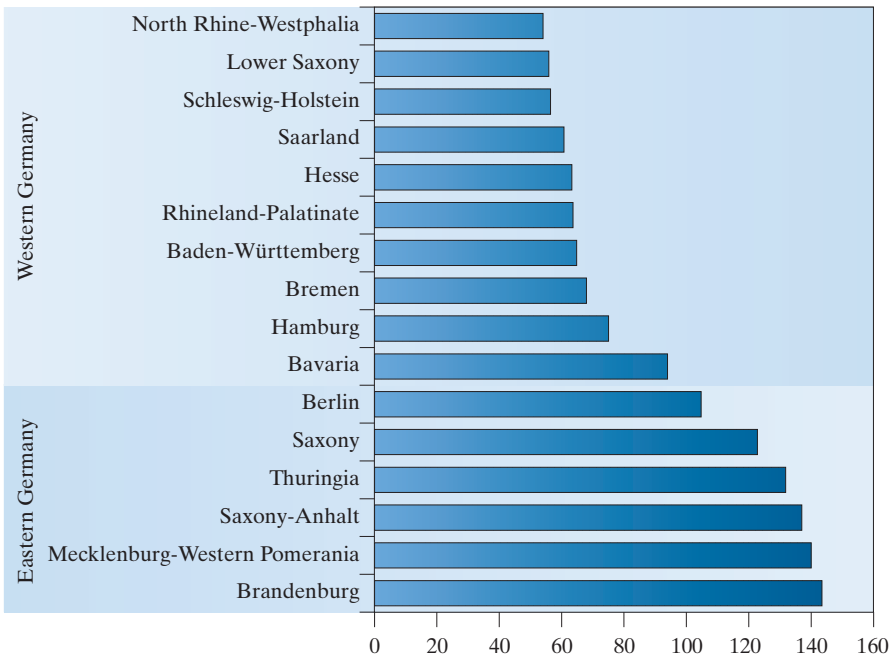
At the same time, the public sector is cutting back its role in the financing of hospital investments. The economy faces huge debt and crippling budget deficits. At the beginning of the 1990s, the total lump-sum and one-off subsidies paid by the state under the Krankenhausfinanzierungsgesetz (KHG – Hospital Financing Act) was of the order of € 3.6 to 3.9 billion per year. By 2003, the figure had fallen to € 2.8 billion or, in terms of 1991 prices, € 2.3 billion (Figure 1). As a result, replacement investments have not been made to the extent required. According to our calculations, an investment backlog of almost € 12 billion built up in the period from 1991 to 2003.

This backlog mainly concerns the Western German states as the Eastern German states and Berlin received special subsidies following German reunification. In Western Germany, Bavaria was the state to receive the highest

Figure 2

Large differences between subsidy levels for German states

Cumulated subsidies, 1991 to 2003, in thousand euros per bed



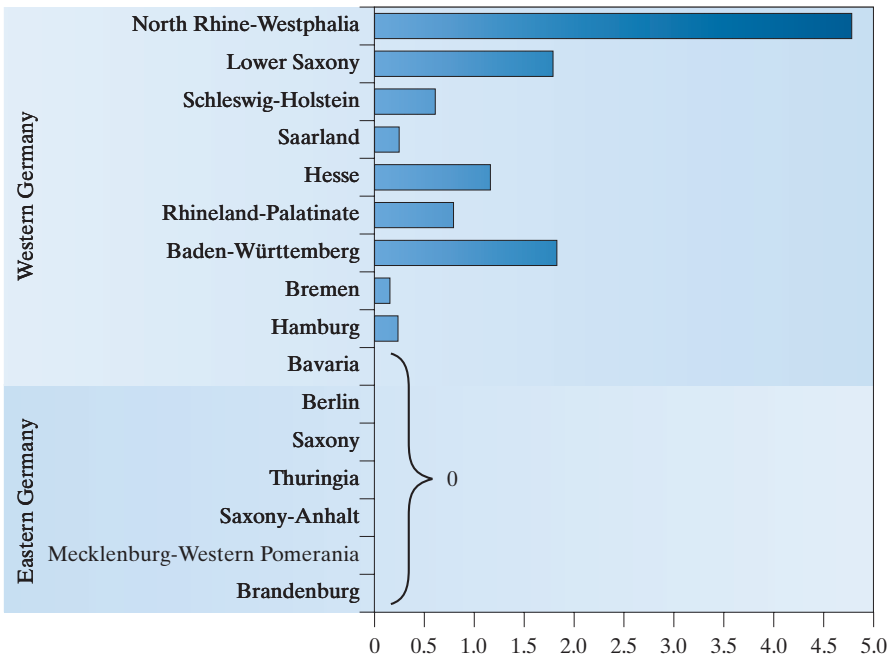
Analysis by ADMED and RWI Essen. Mörsch (2004).

subsidy per hospital bed (Figure 2). Our estimate of the total investment backlog is based on the gap between subsidies for the other Western German states and Bavaria (Figure 3). If required standards of hospital equipment are even higher than in Bavaria, the investment backlog would of course be even larger.

Many hospital operators, especially local authorities, have ceased to finance the annual deficits of their hospitals. Local authorities, whose financial situation is also parlous, are increasingly transferring their hospitals to private operators or at least ending their practice of absorbing losses. There are two reasons why this development is to be welcomed. First, the absorption of losses is not acceptable from a competition law point of view. Secondly, it provides hospital management with entirely false incentives if losses have no consequences. In addition, the hospitals whose losses continue to be absorbed, build up, as it were, an adjustment backlog.

Figure 3

Investment backlog[1] of approx. € 11.6 billion
1991 to 2003, in € billion



Analysis by ADMED and RWI Essen. Mörsch (2004). – [1]With reference to Berlin, the investment backlog would be € 16,1 billion.

Many hospitals face a number of risks in other areas, too. The decision by the European Court on working hours and the first signs of an imminent shortage of medical and nursing staff will increase the pressure on staff costs. In view of higher salaries, young doctors are already migrating to other Western European countries and Scandinavia or working on other sectors in Germany. At the same time, numbers of medical students are falling. All in all, these developments will lead to a shortage of medical practitioners which will certainly have an impact on salaries in the long term.

In the medical field, a trend towards outpatient operations will lead to reduced income on the one hand, at least in the medium term, without resulting in corresponding reductions in expenditure on the other hand. Before expenditure can be reduced in line with this development, it will be necessary to adapt the inpatient infrastructure available and to develop additional infrastructure for outpatients. In addition, certain operations are subject to statutory limits: if a hospital does not perform at least a minimum number of these operations, it

will no longer be allowed to perform them at all. Six types of operations, including full knee replacement surgery are currently affected. Although the objective of these minimum volume requirements is to improve the quality of the operations concerned, many small hospitals must expect a reduction in their income if they are no longer allowed to offer these operations.

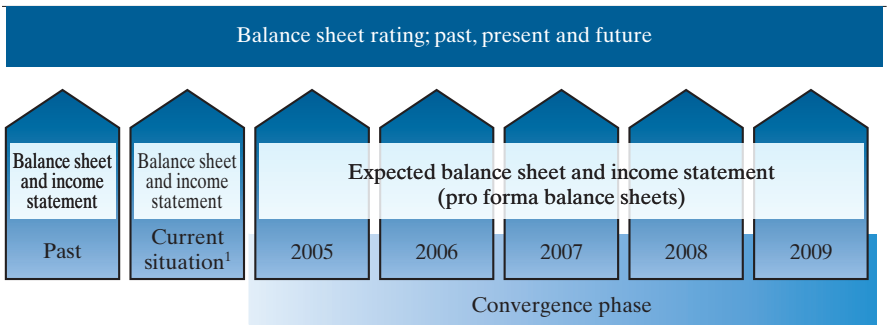
As a result, hospitals face growing pressure to adapt to changing circumstances. On the one hand, more and more action is required to ensure the efficient use of the resources available. On the other hand, the fall in state subsidies will lead to increasing demand for other sources of financing. These will include not only conventional bank loans but possibly also alternative financing models such as subordinate loans or private equity (Augurzky et al. 2004b). In this connection, the creditworthiness of a hospital will become increasingly important in determining access to capital. As there are in some cases considerable differences between the economic situations of individual hospitals, it will be of considerable strategic importance for each institution to assess its own position on the market and its basis for negotiations with potential lenders in a realistic and proactive way.

At the same time, there has been a sustained process of change on the part of banks[4], resulting in more intensive consideration of the present and future financial capabilities of potential borrowers. The impetus for this continuing process of change was given by Basel II, the banking supervision regulations of the Basel Committee which are to come into force in 2007 and lay down capital requirements for banks in connection with loans granted and subsidiaries (appendix). For borrowers which pose a low risk, the definition of loan conditions in line with the risk entailed means that loans will become less expensive. On the other hand, high-risk borrowers must be prepared to accept worse conditions or, in the worst case, may find that they are unable to secure loans from banks. Given the hospitals' situation, it is to be expected that the probability of default (PD) of an average hospital will rise in the future and that the financing situation of hospitals with poor creditworthiness will deteriorate. It is therefore evident that hospitals cannot remedy their poor economic position simply by borrowing. Indeed, large-scale borrowing will only be possible for the purpose of financing promising future-oriented projects. As a general trend, this may lead to a reinforcement of the current situation of hospitals.

4 Since the mid-1990s, the elimination of regulation in the financial sector and the networking of economies have led to a change in the behavior of bank customers and the competitive situation of the German banks. As a result, there have been structural shifts in bank balance sheets and deterioration in the earnings position of banks. On the part of the banks, there have been improvements in risk management, resulting among other things in the development of conditions for loans which are appropriate for the risks involved.

Figure 4

Objective of study: presentation of current economic situation and expected ratings of hospitals



Analysis by ADMED and RWI Essen. – [1]The latest balance sheet available, normally for 2003, was used.

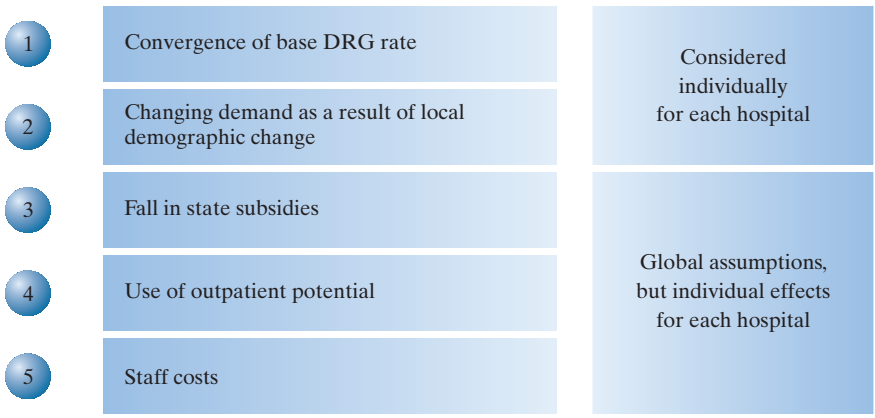
To date, little research has been conducted into the specific scope of these changes. In particular, there is a lack of precedents for the empirical determination of the key parameter, the risk of default. Such experience is essential for an individual assessment of the risk of default. Experience gained in other sectors cannot simply be transferred to hospitals in view of the independent nature of the hospital sector. There is therefore a need for further research in this area.

The conditions described above will lead to considerable changes in the hospital sector in the next few years. On this basis, this study concentrates on the present and future economic situation of hospitals. The fact that guarantees given by hospital operating bodies may serve to prevent closure in the event of overindebtedness has not been taken into consideration. In view of recent cases of hospital closures and failed attempts at privatization, detailed knowledge of the financial situation of the hospital environment without guarantors is essential.

Using a balance sheet rating system, we have calculated current and expected future probabilities of default (PD) for 277 hospital balance sheets covering a total of 347 hospitals (Figure 4). Expected future PD values were calculated on the basis of the following scenarios (Figure 5):

1. DRG convergence by 2009;
2. Demand changes as a result of demographic change at the local level;
3. Fall in state subsidies;
4. Increased use of outpatient potential;
5. Staff costs.

Figure 5
Major developments considered in this study



Analysis by ADMED and RWI Essen.

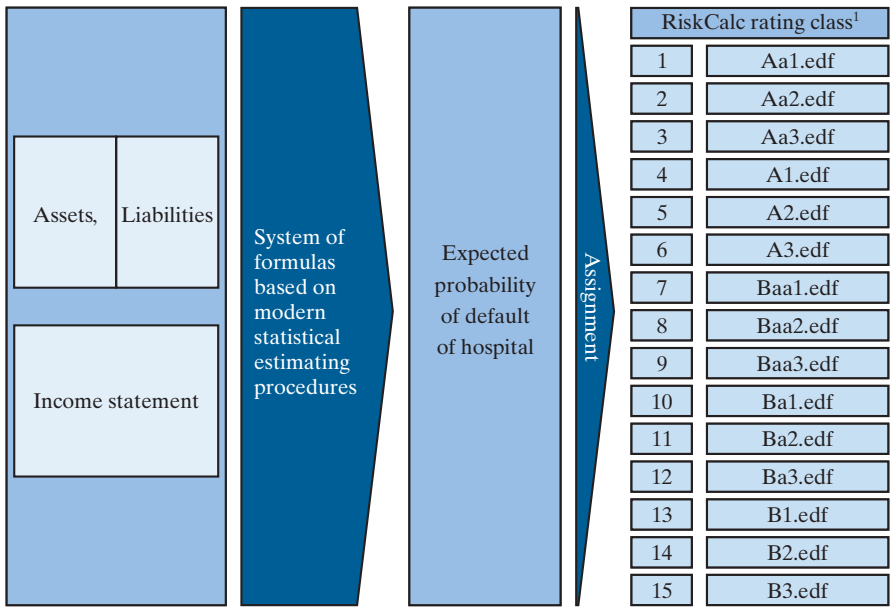
The effects of the scenarios are considered individually and in combination.

These ratings are followed by a scientific analysis of the ratings and changes in the ratings with reference to systematic differences between hospitals (e.g. as regards operators, region, size). The investigations are rounded off by additional analyses of the staff cost situations of hospitals operated by different types of bodies. The study concludes with proposals and recommendations for action by politicians and hospitals.

Section 2 of this study describes the database used and the methodology for calculating current and expected ratings of hospitals. Further details of the methodology are given in the Appendix. The results of our analyses of the economic situation of hospitals are presented and discussed in detail in Section 3. Conclusions on the political and in some cases on the business level are presented in Section 4. Section 5 contains the conclusions. The hospitals included in this study are dealt with entirely anonymously and it is not possible to draw conclusions as to the identity of individual hospitals from the information presented.

Figure 6

Pro forma balance sheets are the basis for the rating



Analysis by ADMED and RWI Essen. – [1]This is an independent classification system. The suffix edf (expected default frequency) indicates that this is purely a balance sheet rating calculated using *Moody's RiskCalc*™ and not an internationally recognized rating issued by Moody's Investor Service.

2. Basis

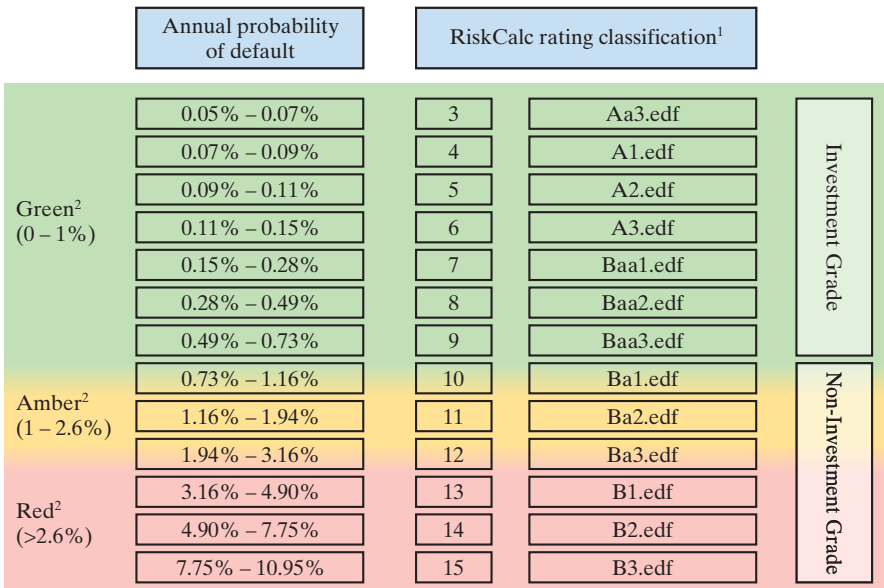
2.1 Overview of Methodology

This study uses a balance sheet rating system to calculate the PD value of a hospital from its balance sheet. The rating tool used is *Moody's RiskCalc™* [5]. The PD values may be between 0% and 100% and indicate on a yearly basis the probability that the company concerned will fail to meet its payment obligations and may have to declare itself insolvent. In practice, the figures are between 0% and about 5%. The values calculated are assigned to rating classes (Figure 6). The best creditworthiness corresponds to class Aa1.edf and the worst to class B3.edf.

[5] It was not possible to use a special hospital rating system developed by ADMED and RWI Essen as the internal data required were not available for the overwhelming majority of the hospitals concerned.

Figure 7

For each year, the ratings are classified on the basis of calculated probability of default



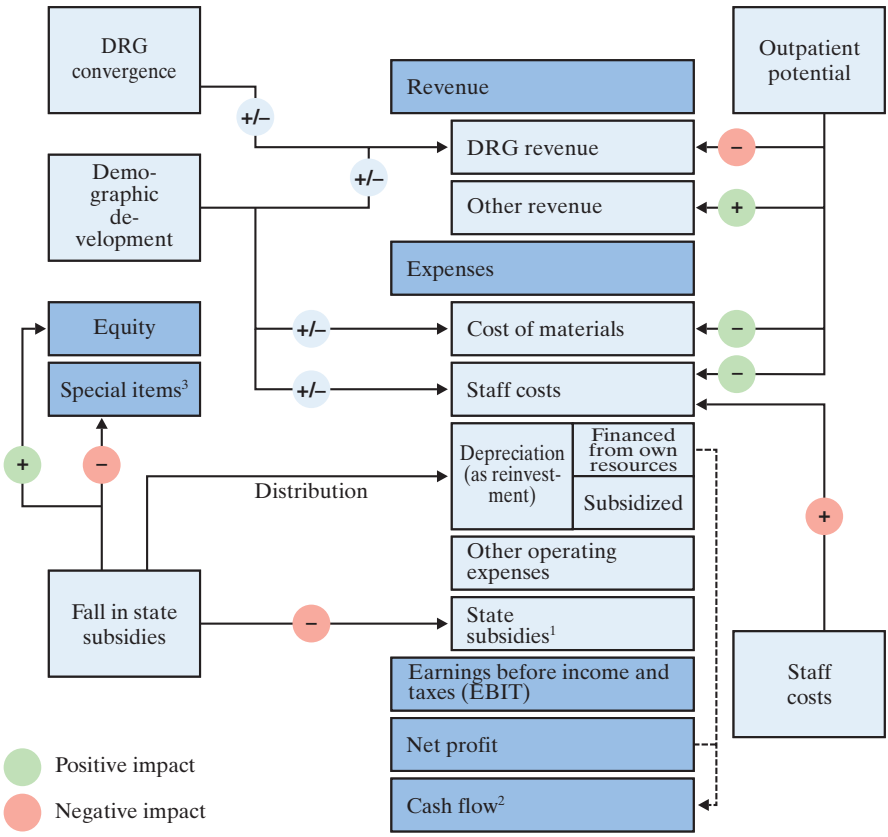
Analysis by ADMED and RWI Essen after Moody's (2001). – [1]The first two rating classes are only important for state institutions, not for medium-sized companies; they are therefore not considered here. – [2]Similar traffic-light rating schemes are frequently used by banks.

Factors which are expected to affect hospitals are taken into consideration in the ratings in the form of scenarios. On the basis of the scenarios outlined above and the current balance sheets, we drew up pro forma balance sheets and profit and loss accounts for each year of the DRG convergence phase, from 2005 to 2009. Balance sheet ratings were then calculated from these pro forma financial statements in the same way as from the current financial statements. The results are expected future ratings for the years from 2006 to 2010. We assume that the forecast rating will only be reached at the end of the convergence stage concerned, i.e. at the end of the year, and that all the ratings therefore refer to the following year. Apart from the rating itself, a number of key business figures are also presented.

For the sake of greater clarity, the PD values calculated have been assigned to a "traffic light" system. Values between 0.0% and 1.0% correspond to a slight to moderate risk of default and are assigned to the green zone in this system. Hospitals in the green zone should be able to obtain loans without any problems. Hospitals with values from 1.0% to 2.6% are assigned to the amber zone; in this zone, borrowing will become more difficult and more expensive.

Figure 8

Major influences taken into consideration in the pro forma balance sheets



Analysis by ADMED and RWI Essen. – [1]In the long term, state subsidies will correspond to depreciation on subsidized investmens. – [2]Sum of net profit for year and depreciation on investments financed from own resources. – [3]State subsidies in the balance sheet.

Hospitals with PD values above 2.6% are assigned to the red zone; such hospitals may have problems in securing loans and further borrowing may not be possible at all (Figure 7).

These scenarios do not affect the pro forma balance sheet directly but do affect the income statement and therefore have an indirect impact on the pro forma balance sheets via the net profit for the year (Figure 8). Only falls in KHG state subsidies also have a direct effect on the liabilities side of the balance sheet. Depending on the level of the DRG base rate, the DRG convergence process results in a rise or a fall in DRG-relevant revenues. Additional

fees are not taken into consideration. We do not model cost adjustment measures. The scenarios are based on the assumption that hospitals will only behave passively.

In each district, demographic developments will lead to a different demand for hospital services. Demand depends on the expected population and the age structure at the district level (Bundesamt für Bauwesen und Raumordnung 2005). The calculations are based on the number of cases per age group and medical specialty from 2003 (Statistisches Bundesamt, 2005b). We have assumed that the demand structure for the services of the specific departments for each age group will not change in the near future. This means that medical and technical progress and the increasing trend towards outpatient operations have not been considered in this scenario.

For Germany as a whole, we assume that demand for hospital services, measured by the number of cases, will rise about 4% by 2010. As the population is expected to remain unchanged, this rise will be solely the result of an increase in the average age of the population. The number of people older than 56 will increase by about 6% by 2010. However, as hospital budgets are to remain capped, it is not expected that there will be a corresponding increase in hospital income throughout Germany. At the same time, the costs caused by growing patient numbers will rise, probably resulting in deterioration in the average rating.

At the district level, however, demand for hospital services will develop in a very heterogeneous way. There are districts which are growing or shrinking and where the population is ageing more or less rapidly. The specific structure of specialist departments at individual hospitals also plays a key role in demand. For examples, hospitals specializing in paediatric medicine or obstetrics, areas typically suffering from a severe fall in demand, will be adversely affected even if there is disproportionate growth in the general demand for hospital services in the districts where they are located. As a result, some hospitals will face growing demand, others stagnating demand and others falling demand. We therefore expect a redistribution of income between hospitals. Hospitals where growth in demand is above 4% can expect rising income; those with a lower growth rate must expect income to fall.

As in the past, we expect that state subsidies will fall 5% per year in real terms. As the amount of subsidies per hospital was not available, we adopted the following procedure. Initially, we recalculated one-off subsidies granted at irregular intervals to obtain annual figures, which we then added to the annual subsidies. For the purpose of the analysis, only these fictitious annual subsidy figures were taken into account. As the next step, we determined reinvestments or depreciation in connection with the subsidized fixed assets of each individual hospital. In principle, these reinvestments or depreciation figures

should be covered by state subsidies. However, the fall in state subsidies means that only 95% of these reinvestments are covered by state subsidies each year and the remaining 5% need to be covered from the hospital's own resources. As a result, the special items on the balance sheet must be reduced step by step. As we will see, this is, however, a very slow process.

Outpatient surgery at hospitals is certainly not a new topic, but one which has become increasingly important. Not every surgical procedure need necessarily involve a stay in hospital. In the case of minor operations, it is conceivable that a patent could come to the hospital on the morning of the operation and leave the hospital on the same day when the procedure has been successfully completed. From an economic point of view, outpatient surgery is a positive phenomenon if the cost of treatment can be reduced without sacrificing quality. This is why we refer to the outpatient *potential*.

However, from the point of view of the hospital, this potential also entails a risk that services which have previously been provided for inpatients will now be provided for outpatients at lower rates. It is true that hospitals also have lower costs for outpatient procedures and that part of the infrastructure needed for inpatient treatment would no longer be required. However, before savings of this type can be realized, it will be necessary to make appropriate adjustments to existing infrastructure and procedures. In addition, hospitals must succeed in retaining the outpatients concerned instead of losing them to self-employed specialists with their own practices. In the medium term, more outpatient surgery will mean less DRG income; there will be a fall in costs, but this will not be commensurate with the loss of income. Over a time period of at least five years, the net loss in this connection will be of the order of 4% to 6%. In the long term, it will be possible to adapt inpatient and outpatient structures to the new situation, leading to gains in this segment. However, this period is outside the time horizon for our study.

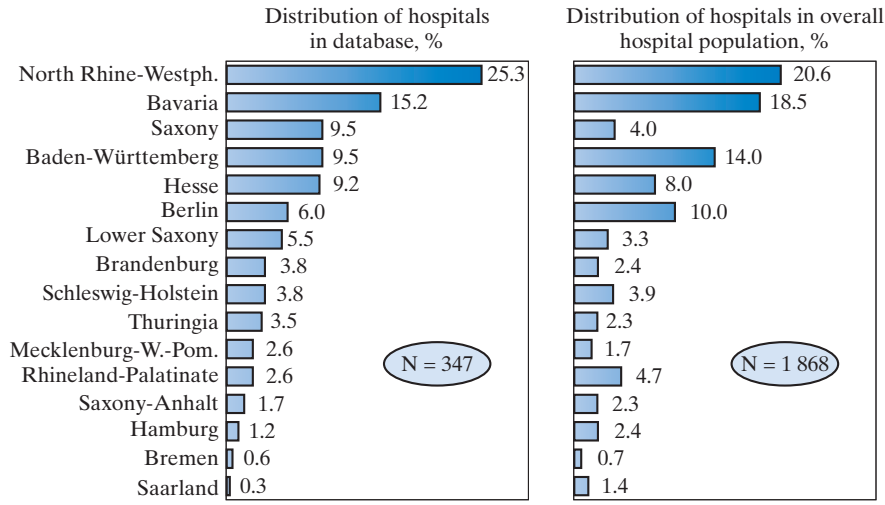
The expected increase in staff costs is another scenario. We assume that the increase in staff costs in real terms which cannot be covered by budget adjustments will be 0.5% per year. These increases will be driven by the pegging of salaries to the collective bargaining agreement for the public sector or similar agreements, growing expenses for medical services in connection with the new working time regulations and a shortage of medical practitioners.

We use these scenarios to calculate the rating of the average hospital over the next few years. We also investigate the questions of which characteristics of a hospital affect its rating. On the one hand, the rating is clearly defined by a number of balance sheet indicators (see Appendix). On the other hand, hospital-specific factors such as type of operating body or location may be correlated with the balance sheet figures and therefore also with the rating. In order to identify the effect of a single factor and to separate it from other factors,

Figure 9

The sample consists of 347 hospitals[1]

Comparison with distribution of general hospitals by federal states



Analysis by ADMED and RWI Essen. Based on information in Statistisches Bundesamt (2005a). – [1]The total number of financial statements is 277, but some of these represent a small hospital chain. Large hospital chains have not been considered because they operate in several federal states.

multi-variate regression analysis is carried out. Such analyses take all the factors investigated into consideration simultaneously, whereas a bivariate analysis can only consider the effects of an individual factor on the PD (Section 3.2).

2.2 Database

Our study is based on a database including 347 hospitals or 277 financial statements for several years. The discrepancy between the numbers of hospitals and financial statements is a result of the fact that hospital chains only issue an annual report for the entire group and not for individual hospitals. However, large hospital chains such as Rhön-Klinikum AG and Helios Kliniken GmbH[6], have been excluded from the study as they operate hospitals in a number of federal states which will be affected to different extents by DRG convergence. Small hospital chains (up to 5 hospitals) were included.[7] The individual hospitals of these smaller chains are normally located in a small

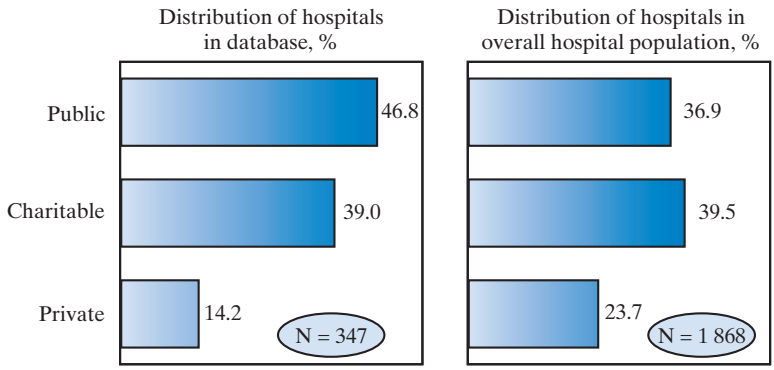
6 Now part of the Fresenius Group, still independent at the time of the study.

7 Where separate financial statements were available for hospitals forming part of such chains, the individual hospitals were taken into consideration.

Figure 10

Distribution by type of operator

Comparison with distribution of general hospitals by federal states

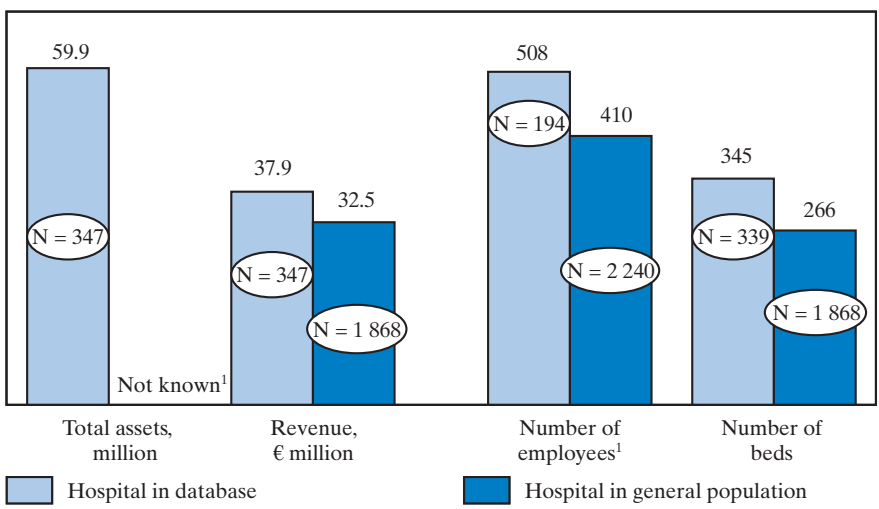


Analysis by ADMED and RWI Essen. Based on information in Statistisches Bundesamt 2005a. Non-weighted averages.

Figure 11

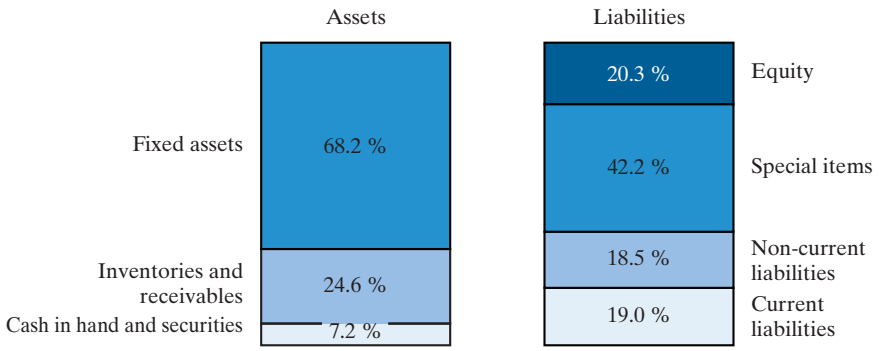
The size of the hospitals in the database is above the average

Average hospital in database and general population



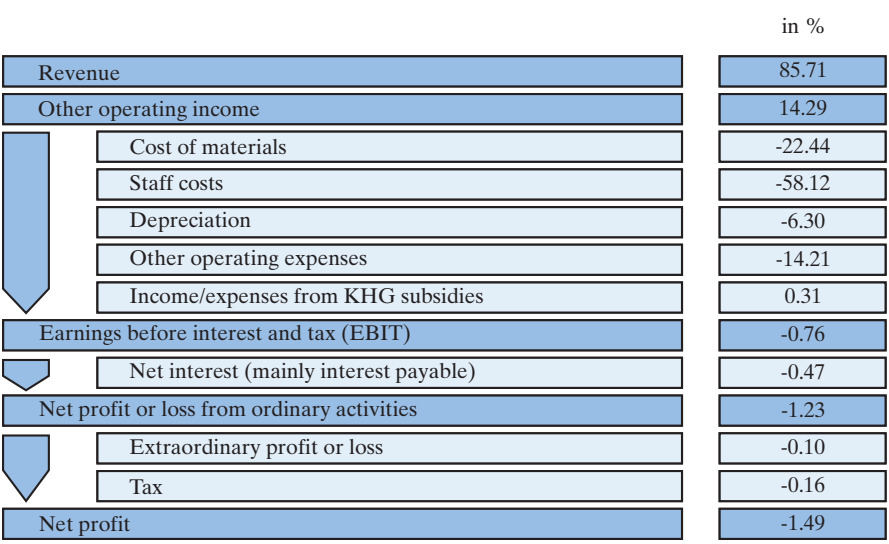
Analysis by ADMED and RWI Essen. Based on information in Statistisches Bundesamt (2005a, c). – [1]Full-time employees; for the database, figures were converted to a full-time basis by multiplying them by 1.23 Statistisches Bundesamt 2005a). For this analysis, the individual hospitals of a chain were counted individually.

Figure 12
Fixed assets covered by long-term capital



Analysis by ADMED and RWI Essen. Averages weighted by revenue.

Figure 13
Negative average return on sales

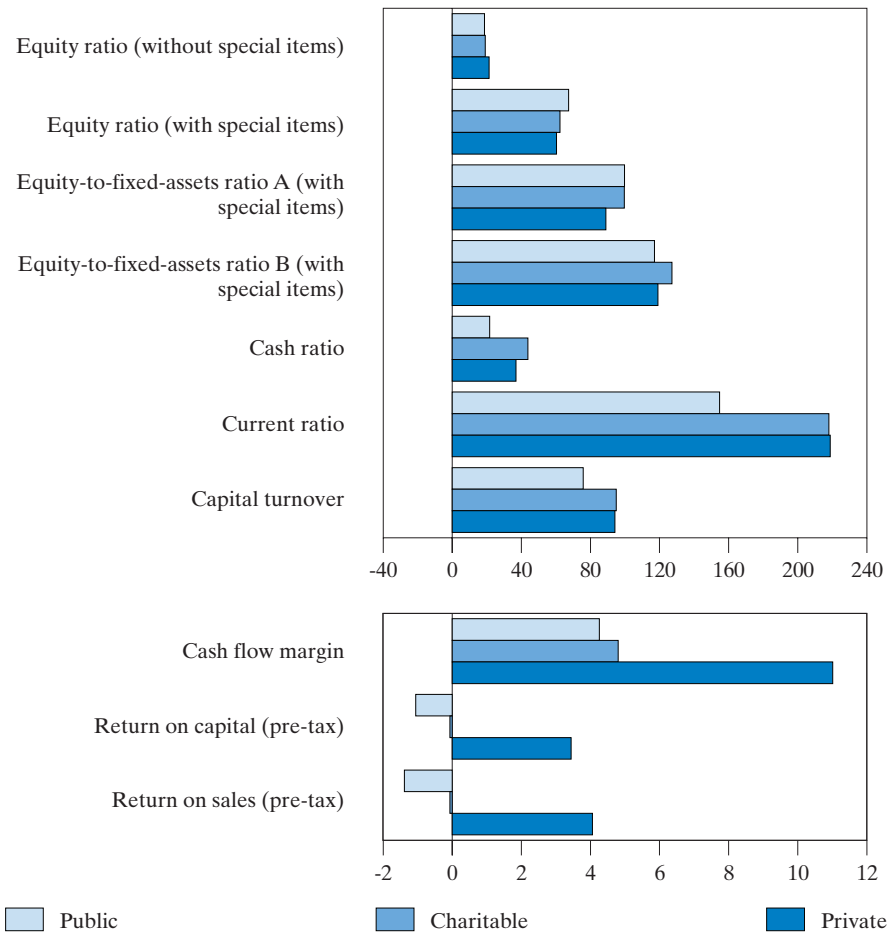


Analysis by ADMED and RWI Essen. Averages weighted by revenue.

area within one federal state. We have calculated a weighted average base rate for the individual hospitals of such chains as well as weighted demand in connection with demographic developments.

Figure 14

Private hospitals have the best key indicators

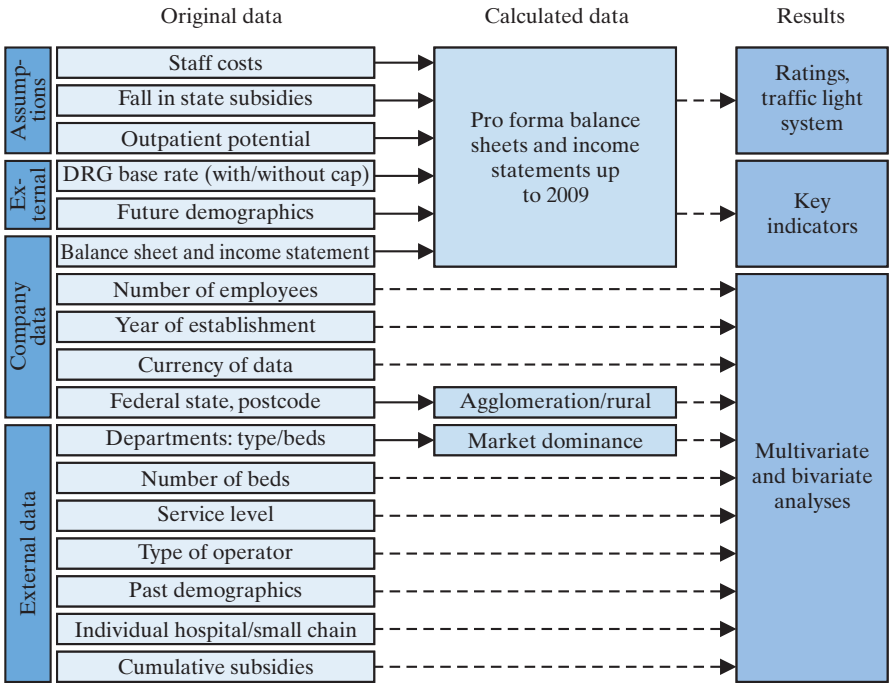


Analysis by ADMED and RWI Essen. The values shown are medians in each case, in order to ensure that outliers are not given excessive weighting.

The database is largely in accordance with the distribution of the 1,868 general hospitals in Germany. Special hospitals have not been included. Some federal states are slightly overrepresented or underrepresented in the database (Figure 9). As a result of the exclusion of large chains, private hospitals are underrepresented (Figure 10). They account for only 14.2% of the hospitals in the database, as against 23.7% of hospitals in Germany. If the two large hospital chains mentioned above, which publish annual reports, were included,

Figure 15

A wide variety of information is analysed



Analysis by ADMED and RWI Essen.

these differences would be eliminated. Public hospitals are slightly overrepresented, as are medium-sized and large hospitals (Figure 11). When the database was established, most hospitals only had financial reports for 2003 (or earlier years) available. We have always included figures from the latest report available and assumed that these were representative of the hospital concerned.

Figure 12 shows the structure of an average balance sheet on the basis of the latest figures available. Fixed assets account for almost 70% of total assets. On average, the equity ratio is about 20% and the special items, accumulated state subsidies, are the largest item on the liability side, accounting for some 42% of total liabilities. These figures are weighted in each case on the basis of revenue. Unless explicitly stated, this approach has been adopted for all the averages presented in this report. Figure 13 shows the structure of an average income statement. Staff costs are the largest expense item accounting for 58% of total income and 68% of revenue (without other operating income). The average return on sales is negative, at –1.5%.

Figure 14 gives an overview of key business indicators, broken down by type of operator. In order to avoid giving excessive weight to outliers, the median, rather than the mean, is shown in this case. In the case of the balance sheet indicators (top section of diagram), the picture is by no means clear. Private and charity hospitals have a slight edge over public institutions. As regards profitability (bottom section of diagram), the private hospitals have a clear lead, followed by the charity hospitals in mid-field and the public hospitals bringing up the rear.

In addition to the annual financial statements, a variety of other information was analysed for this study. This includes (i) the agreed base rate (without adjustment) for 2004 which forms the basis for convergence (AOK, 2005), (ii) the demographic development at the district level, (ii) the number of employees, (iv) the year of establishment of the hospital, (v) the location, (vi) the department structure and the number of beds per department, (vii) the service level, (viii) the type of operator and (ix) cumulative subsidies at the level of the federal state (Figure 15).

3. The Economic Situation – Current Situation and Outlook

3.1 Status Quo and Forecast

The ratings for hospitals up to 2010 were calculated on the basis of five main scenarios, one of them divided into two sub-scenarios, with one additional scenario that groups all five together (Figure 16).

The basic scenario, on which all the other build, only considers DRG convergence. Scenario 2 also considers demographic development at the district level, the demand for hospital services per department and the resulting revenue and costs. Scenario 3 assumes a reduction of 5% per year in state subsidies. Scenarios 4 assumes an outpatient potential of 5% and 7.5% of revenue respectively up to 2010 or a net fall in revenue of 4% or 6%. Scenario 5 assumes an annual real-term increase in staff costs of 0.5% above budget growth. Finally, Scenario 6 considers all these factors, together with outpatient potential resulting in a net loss of 4% of revenue.

The probabilities of default in the basic scenario are shown in Figure 17. Currently, the average PD is approx. 1.7%; the average hospital is therefore in the amber zone of the traffic light system. By comparison, the average PD in 2004 was 1.1% for Western German and 2.1% for Eastern German medium-sized companies as a whole (Bindewald et al. 2004). At this point, it should be emphasized that the PD values calculated do not take into account any guarantees issued by the operating organizations.

Figure 16

Several scenarios are investigated

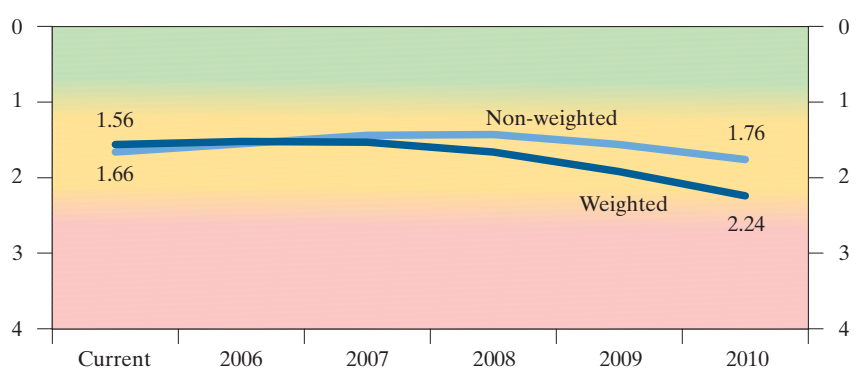
Scenario[1]	Basic	1	2	3	4	5	6
DRG convergence	yes	yes	yes	yes	yes	yes	yes
Demographic development at district level	no	yes	no	no	no	no	yes
Fall in state subsidies: 5% p.a.	no	no	yes	no	no	no	yes
Low outpatient potential: 5% to 2010[2]	no	no	no	yes	no	no	yes
High outpatient potential: 7.5% to 2010[2]	no	no	no	no	yes	no	no
Rise in staff costs:: 0.5% p.a.	no	no	no	no	no	yes	yes

Analysis by ADMED and RWI Essen. – [1]All values in real, rather than nominal terms. – [2]It is assumed that a fifth of the outpatient potential, i.e. 1% or 1.5%, will be recouped in the form of additional outpatient revenue and that the loss of revenue will therefore be only 4% or 6%.

Figure 17

The average rating is in the amber zone

Expected probability of default in% – basic scenario

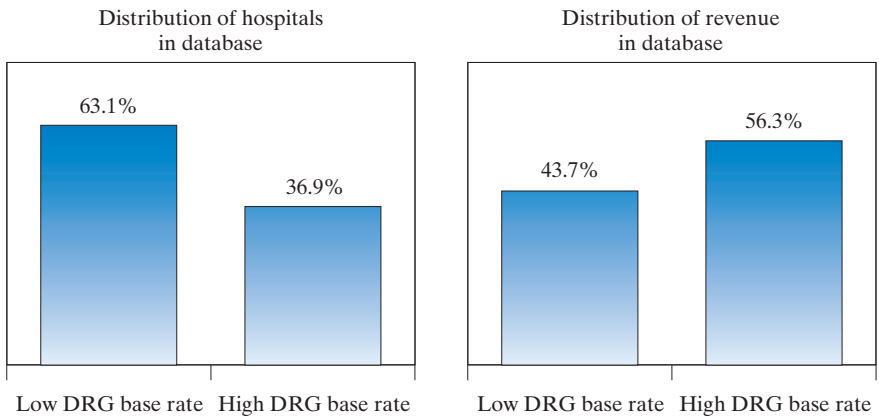


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Neglecting the size differences between hospitals (and using non-weighted averages), the calculated value of 1.7% remains virtually unchanged up to 2010. However, if the individual hospitals are weighted on the basis of their

Figure 18

In convergence phase, more winners in terms of numbers, not in terms of revenue

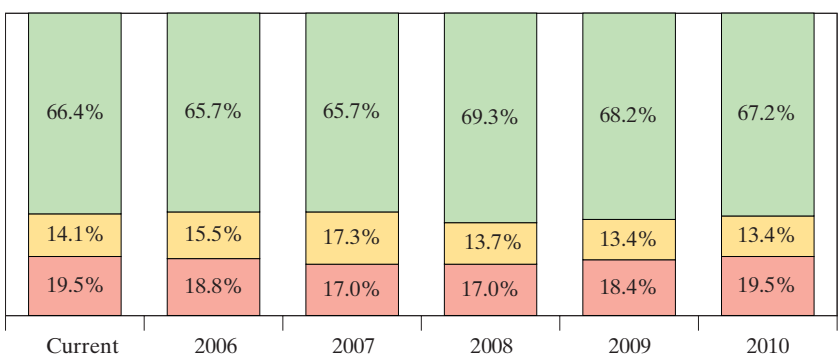


Analysis by ADMED and RWI Essen.

Figure 19

20% of hospitals in red zone

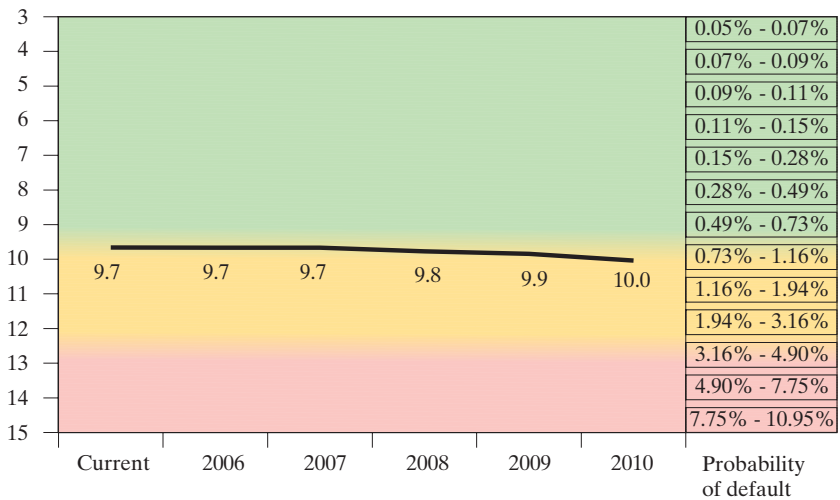
Distribution of hospitals by traffic light system; no weighting



Analysis by ADMED and RWI Essen after Moody's (2001). No weighting.

revenues, the value deteriorates to about 2.2% by 2010. This is the result of the fact that, as already mentioned, the PD of large hospitals will tend to deteriorate in the course of DRG convergence. This analysis is supported by the fact that 63% of hospitals have a base rate below the state average and 37% above the state average but that those with below-average rates account for only 44% of the total revenue within the database, as against 56% for those with above-average rates (Figure 18).

Figure 20
Expected average rating class



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

The distribution of the ratings shows that 66% of all hospitals are in the green, 14% in the amber and 20% in the red zone (Figure 19). DRG convergence will only result in a slight change in these figures. However, with hospitals weighted by size, almost 29% of hospitals will be in the red zone until 2010, while the green zone will shrink to 55%. Although a significant majority of hospitals are in the green zone, the average hospital is in the amber zone. The reason for this is that the red zone has virtually no upper limit while the green zone has a lower limit at 0%. Hospitals in the red zone therefore have a considerable effect on the average value. If, instead of the probability of default, we were to consider the rating classes using a roughly logarithmic scale, the average rating class would remain virtually unchanged during the DRG convergence phase (Figure 20). The rating classes are more sensitive in the low PD range than in the high range.[8] On this basis, there is practically equal scope for improvement or deterioration in a hospital's rating and hospitals whose ratings have deteriorated cannot have such an adverse impact on the average.

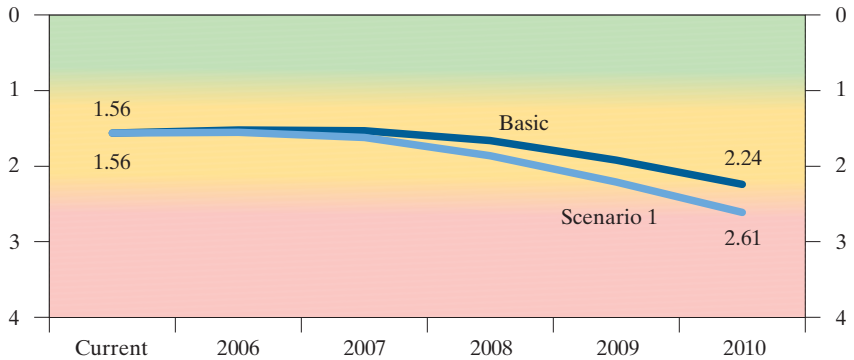
Scenario 2 takes account of the increased demand for hospital services caused by the ageing of the population. Figure 21 shows the results compared with the weighted basic scenario. As a result of budget capping, growing demand for

8 On a logarithmic scale, the distance between 1.0% and 0.01% is the same as between 1.0% and 100%.

Figure 21

Higher costs and constant budgets: demographic developments make the situation worse

Expected probability of default in%

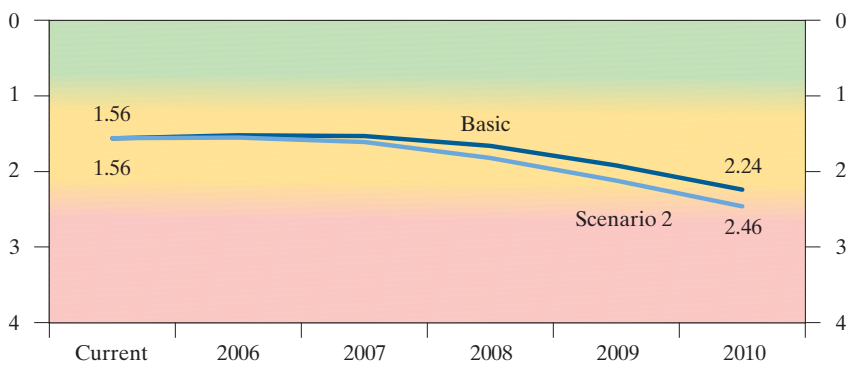


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 22

Expected fall in state subsidies – no drastic impact

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

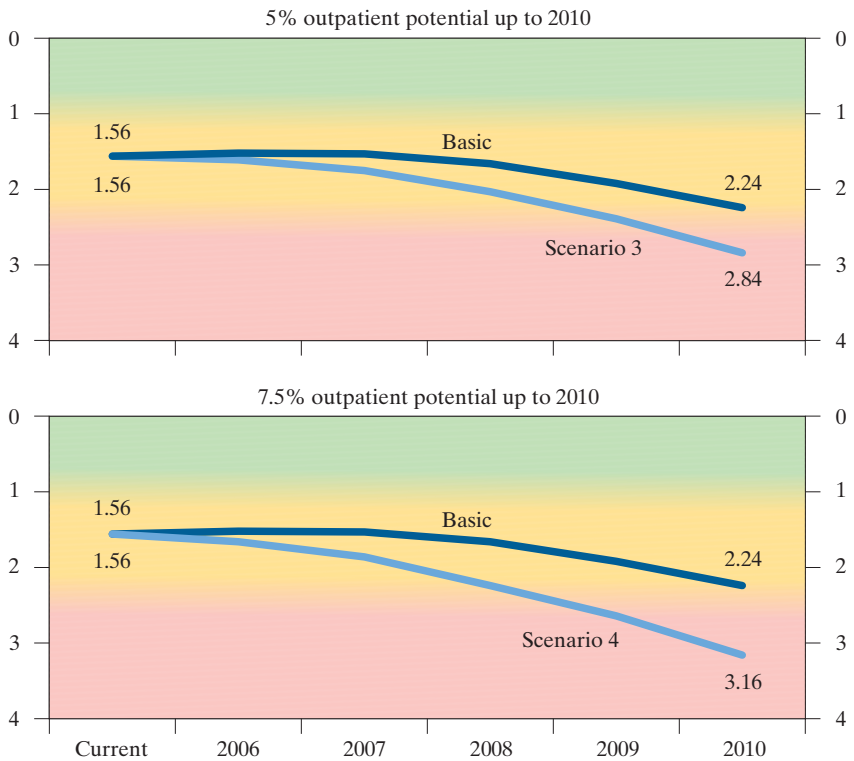
services will, as described in Section 2.1, result in an increase in costs, but not in revenues at the national level. This explains the deterioration in the average PD up to 2010 with reference to the basic scenario and the drift into the red zone.

As expected, the fall in state subsidies (Scenario 3) will not improve the situation compared with the basic scenario. However, this factor only leads to a slight deterioration in the expected PD up to 2010 (Figure 22). In this scenario,

Figure 23

Realization of outpatient potential may threaten many hospitals

Expected probability of default in%



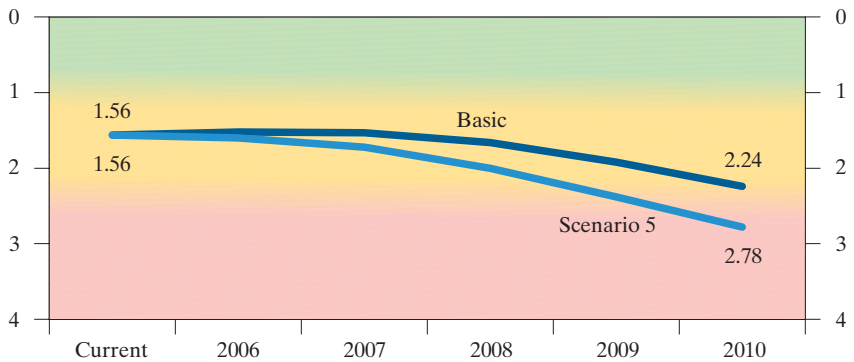
Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

the absolute amount of special items will only fall by 2% by 2010. The reduction in subsidies is a slow process which will only become apparent in balance sheets in the very long term. It will however become evident in the income statements more rapidly as the fall in KHG subsidies directly reduces revenue.[9] This is the main reason for the effect of this factor on the rating.

At least in the medium term, the tapping of the outpatient potential (Scenario 4) will have a significantly more dramatic effect on hospitals. A shift of only 5% from the inpatient to the outpatient sector over the next five years, resulting in a net loss of about 4% of revenue would already lead to a deterioration in the average PD to 2.8% by 2010 (Figure 23). With a shift of 7.5% to

9 As already mentioned, one-off subsidies have been converted into annual amounts in order to obtain a more stable effect and for easier handling in the scenarios.

Figure 24
Problems caused by rising staff costs
Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

the outpatient sector and a 6% loss of revenue, the average PD would even deteriorate to 3.2%. However, it should be possible for hospitals to adapt their cost structures to the new relationships between inpatient and outpatient treatment in the long term and loss of revenue should therefore be offset by corresponding cost reductions.

The effect of rising staff costs (Scenario 5) is similar. If we assume that the annual rate of increase in staff costs (in real terms) will be 0.5 percentage points above the official adjustment of budgets to rising general costs, the probability of default will deteriorate to 2.8%. The average hospital would then be in the red zone (Figure 24).

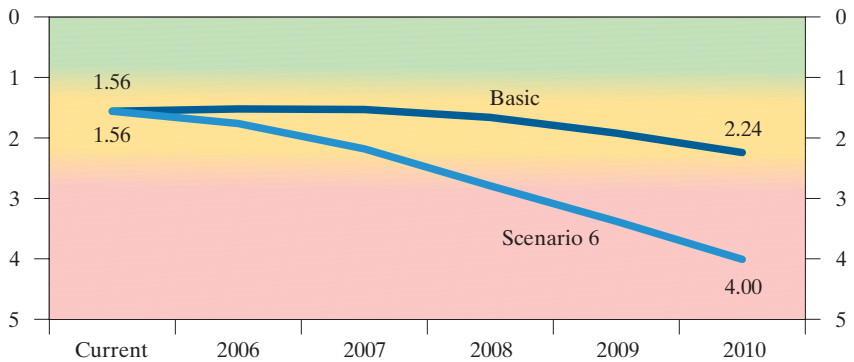
The situation which would develop if all these scenarios coincided can only be described as alarming. In this case, the average hospital would reach the red zone by 2008 and the average expected PD would be 4.0% in 2010 (Figure 25). Against this backdrop, there is an urgent need for action in two respects. Firstly, the hospitals affected will need to adjust their commercial and medical organizational structures and procedures and secondly, government will need to lay the foundations for the adjustments which are required to be implemented rapidly.

These scenarios are based on the assumption that hospitals will remain passive in the face of the expected negative developments. However, we expect that hospitals will take action at an early stage to counteract the effects of these developments and that the situation will therefore not deteriorate as drastically as described above. Proactive hospital managements will recognize the potential risks at an early stage and adjust to them. In view of growing trans-

Figure 25

Alarming situation if all the negative factors coincide

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

parency as a result of the DRG flat rate system and the tendency which has been observed towards more professional management and more effective management tools at hospitals, there is room for some optimism. Section 4 deals with these aspects in more detail. Nevertheless, a wave of hospital closures must be expected in the future.

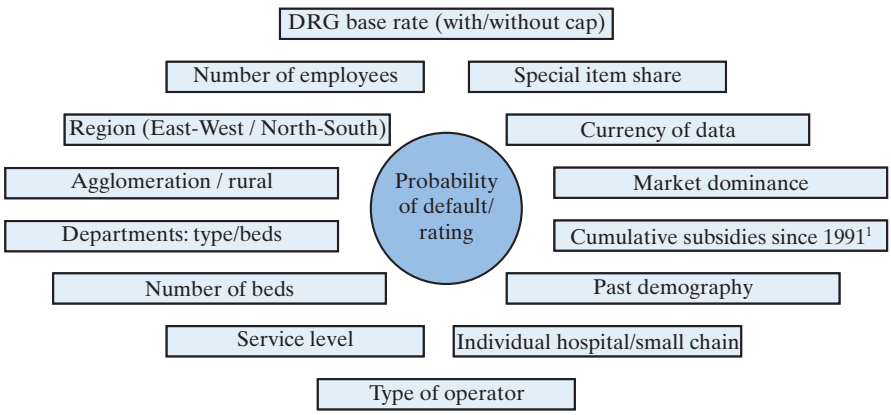
3.2 Factors Affecting the Rating

The results presented above are all based on the average hospital in the database. It remains to be seen which characteristic features of a hospital affect its current rating. Hospital-specific factors such as type of operator or location may be correlated with the balance sheet figures and therefore also with the rating. Figure 26 shows the factors investigated in this connection. For the purpose of investigating these relationships, we conducted a multivariate regression analysis.[10] An analysis of this type allows the effects of the indi-

[10] The following example illustrates the disadvantages of a bivariate compared to a multivariate analysis. Let us assume that a bivariate analysis is to be conducted to demonstrate that a high DRG base rate (as the regression parameter) is positively correlated with a good current rating and that this is also true of the relationship between operation by a private body and a good rating. In this case, the analysis would not answer the question of whether each of the two factors alone could lead to these good results. One explanation for the results could be that the high DRG base rate is the reason for the good rating and that private operation is only correlated with the high DRG base rate and not with the good rating. In this case, it would be incorrect to assert that the operation of hospitals by private organizations was the reason for the good rating. Nevertheless, the coefficient in a bivariate regression (not considering the DRG base rate) would include at least part of the positive effect really attributable to the DRG base rate.

Figure 26

The probability of default may be affected by a variety of factors



Analysis by ADMED and RWI Essen. – [1]At the level of the federal state, not the individual hospital.

vidual factors to be isolated by considering them at the same time and therefore provides a better foundation for the identification of causes than a bivariate analysis. Of course, this is only possible if all the factors which have an influence can in fact be observed. The quality of the data available determines the quality of the results.

The results of the multivariate analysis carried out using the information in the database are shown in Figure 27. We must point out that this analysis refers to the current situation and not to the PD values predicted up to 2010[11].

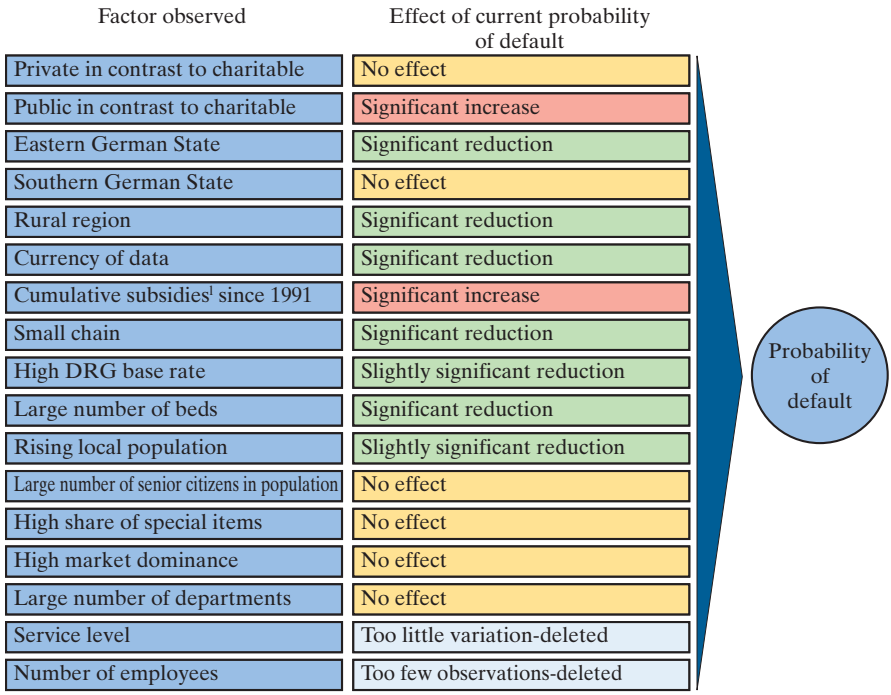
Private[12] and charitable hospitals have a significantly better rating than public hospitals. The slight difference between charitable and private hospitals in favor of private hospitals is not statistically significant. If all the observed properties of the hospitals with the exception of the type of operator are set to the average for the database, private hospitals have a current probability of default of 0.97%, as against 1.13% for charity and 1.85% for public hospitals. One reason for this difference could be that public hospitals had little incentive to use their resources efficiently in the past because the responsible local authorities tended to use tax revenue to compensate for any losses. In

11 We excluded the number of employees from the multivariate analyses because no figures were available from about 50% of the hospitals investigated. If this factor were to be taken into account, it would be necessary to reduce the size of the database accordingly. However, the size of the hospital is already taken into consideration via the number of beds.

12 Once again, it must be pointed out that large hospital chains have not been included.

Figure 27

Multivariate regression analysis identifies effects of individual factors on current probability of default



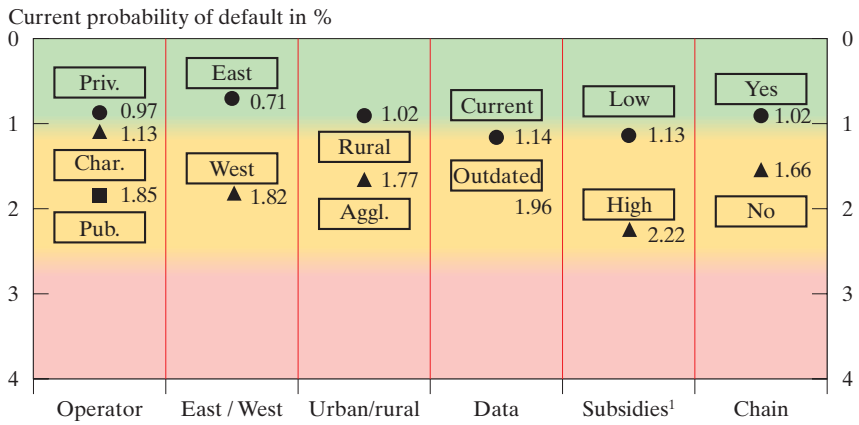
Analysis by ADMED and RWI Essen. – Weighted by revenues, withour large hospital chains. – [1]At the level of the federal state, not the individual hospital.

addition, public hospitals are subject to greater political influence, which may have conflicted with economic considerations in the past.

Figure 28 compares other factors. In each case, all the other characteristics are set to the average value and only the factors considered are differentiated. Hospitals in Eastern German states have a significantly lower probability of default (0.71%) than Western German establishments (1.82%). On the other hand, it was not possible to draw a significant distinction between North and South.

Hospitals in rural areas (including towns located in rural areas) have a significantly better rating than those in large agglomerations (1.02%, compared with 1.77%). We use the term "agglomeration" to refer to large conurbations such as the Rhine-Ruhr or Rhine-Main areas. We are currently unable to find a convincing explanation for this observation. The size difference between rural

Figure 28
Significant differences between groups
Comparison with average hospital



Analysis by ADMED and RWI Essen after Moody's (2001). – Weighted by revenues, without large hospital chains. – [1]At the level of the federal state, not the individual hospital.

and urban hospitals cannot be the decisive factor as size is explicitly included as a parameter in the multivariate analysis.[13]

Hospitals with up-to-date financial reports ("current" in Figure 28) have significantly better rating than those with older reports (1.14% compared with 1.96% ("outdated" in Figure 28)). We assume that external transparency correlates with internal transparency and that a lack of transparency may be a considerable obstacle to efficient management. Another explanation may be that hospitals with a poorer performance tend to conceal their figures for longer.

A surprising result is the relationship between the amount of subsidies and the probability of default. The larger the amounts of subsidies at the level of the state were in the past, the greater is the current probability of default. This result is extremely difficult to explain. It may be that a more generous allocation of subsidies has not resulted in modernization governed by rational and economic considerations but more in the construction of prestige projects which are less functional. It is also conceivable that subsidies were granted with a view to maintaining security of service and that it was hospitals in poor financial condition that tended to receive them. Furthermore, the effects of inaccurate measurement cannot be discounted. This factor was only measured at the level of the federal state and not the individual hospital and the figures

13 For the comparison of rural and urban hospitals, the factor of size is set to the same value.

available can therefore be only considered as the averages for the respective states. Nevertheless, this observation once again calls into question the justification of the current "dualistic" approach to hospital financing.

The share of special items in the balance sheet total of a hospital has no effect on the probability of default. At first glance, this finding may seem to contradict the negative impact of the amount of KHG subsidies. However, as already mentioned, subsidies are only measured at the level of the federal state, not, as in the case of special items, the individual hospital. The two factors are therefore not directly comparable.

The fact that a hospital belongs to a small chain significantly improves its rating, Individual hospitals have an average probability of default of 1.66%, compared with 1.02% for those in small chains. It is probable that a small group generates synergy effects. However, the question of cause and effect must be viewed more critically in the case of parameters such as organizational structure than in the case of factors such as location (in Eastern or Western Germany) over which the individual hospitals have no control. Do more successful hospitals demonstrate a greater tendency to form small groups or are they successful because they have formed groups? We cannot clarify this question with any certainty, although such a clarification would be essential in order to recommend merger strategies for hospitals. As regards an assessment of the probability of default, it is only necessary to use the information on organizational structure pragmatically.

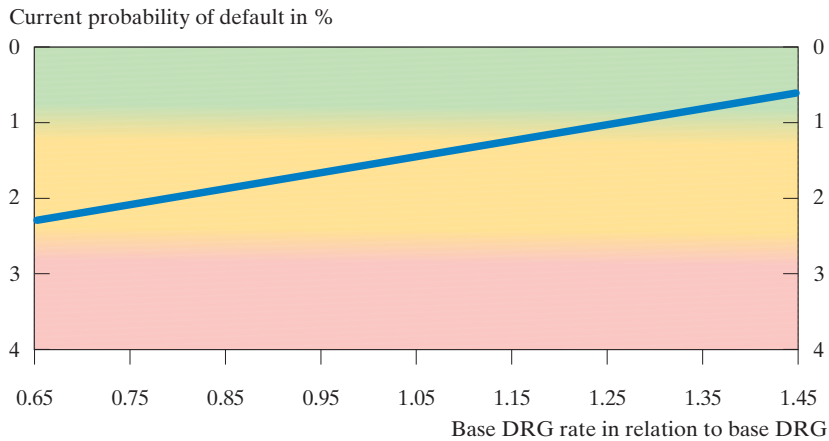
A high base rate leads to a slightly better current rating. Our explanation for this observation is as follows. A high base rate in 2004, before the beginning of convergence, means that the hospital has a relatively high budget compared with the services offered. This may indicate that the hospital has been more successful in negotiations with health insurers in the past, as a result of which its economic situation is better than that of other hospitals. However, in the course of convergence, this relationship between base rate and rating will be reversed. Figure 29 shows the isolated effect of base rate on the probability of default.

In contrast to the previous study, we observed a clear positive correlation between the size of the hospital and the rating (Figure 30). For the previous study, no information on the number of beds had been available and revenue had been used as an approximation for hospital size. In addition, there were fewer small hospitals in the database. The larger a hospital, the better its current rating, i.e. the lower its probability of default. This effect is less pronounced as the size of the hospital increases, and is considerably less pronounced above 1,000 beds, but is not reversed. Size evidently allows hospitals to operate more economically, to distribute fixed costs more effectively and to benefit from economies of scale.

Figure 29

High base DRG rate reduces probability of default at present

Comparison with average hospital

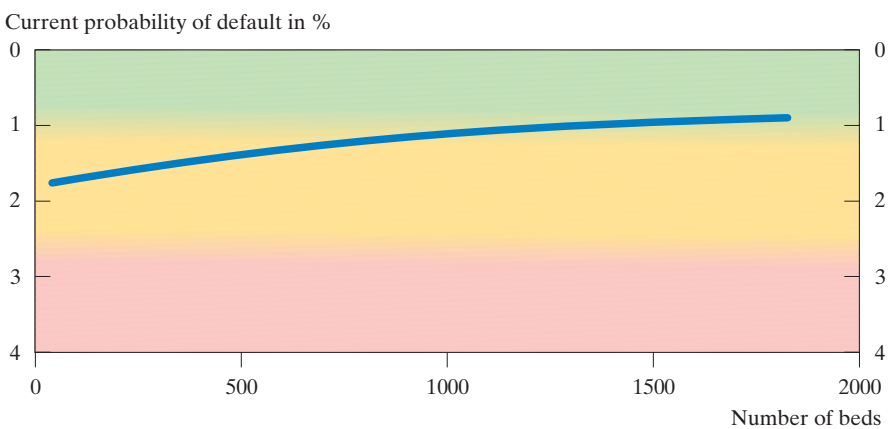


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 30

High number of beds reduces probability of default

Comparison with average hospital



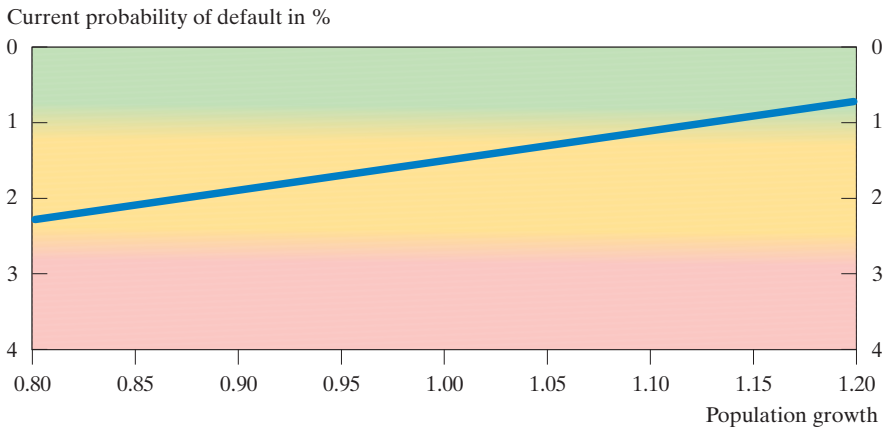
Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

A very interesting result is the relationship between local population growth in the vicinity of a hospital and its rating. Hospitals in areas with higher population growth in the past tend to have a higher current rating (Figure 31).

Figure 31

High population growth in the past reduces probability of default

Comparison with average hospital



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

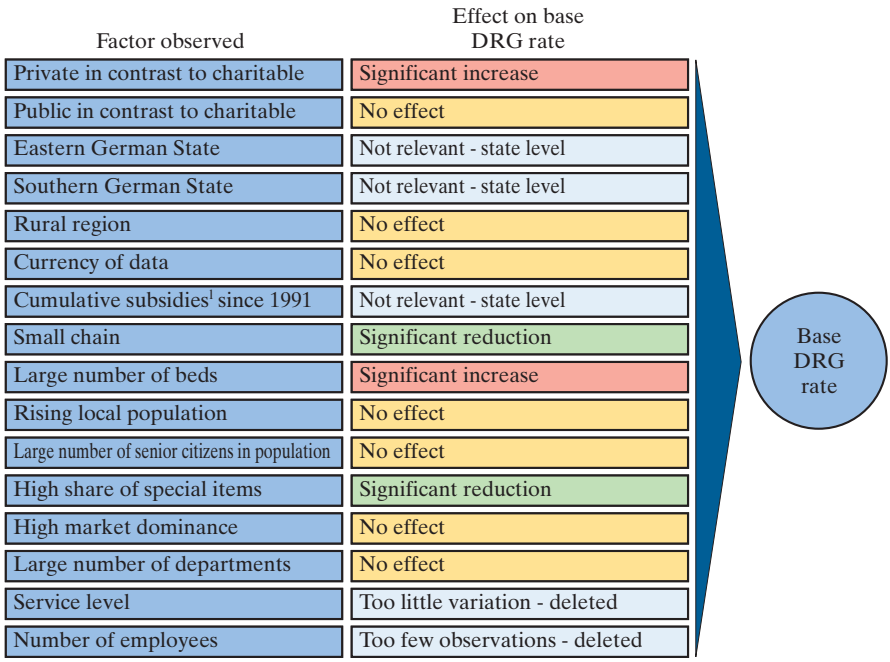
However, in statistical terms, the relationship is only weakly significant. Population growth increases demand for hospital services and allows better capacity utilization. This is not in contradiction to scenario 2, where we found that demographic developments at the national level have led to an overall deterioration in the average rating. It is necessary to draw a distinction between national and local developments. At the local level, above-average growth in demand may well lead to an improvement in the rating of hospitals benefiting from this development. Such hospitals tap demand from other areas. At the national level, however, the budget remains constant and growth is therefore not possible.

Contrary to our expectations, the number of senior citizens in the local population does not have a statistically significant effect on the rating. However, it should be noted that the regional variation in the proportion of older people observed in this study is not of the same order of magnitude as the changes which are expected as a result of demographic changes.

We also found that the number of departments and market dominance had no statistically significant effect on the probability of default. Market dominance is a derived factor which measures the local market position of a hospital. The number of departments is also taken into consideration. As there was insufficient variation, it was not possible to take the service level into account in the analysis.

Figure 32

Multivariate regression analysis identifies effects of individual factors on DRG base rate



Analysis by ADMED and RWI Essen. – Weighted by revenues, without large hospital chains. Regional factors have no effect as they refer to the federal states and DRG convergence takes place within the federal states. – [1]At the level of the federal state, not the individual hospital.

While the results presented above are based on an analysis of the current probability of default, it is necessary to ask which factors will determine the probability of default in the future. To a large extent, this question may be reduced to the simpler question of which factors determine the current base rate, which is the decisive factor in convergence. Figure 32 shows the results of a multivariate analysis of the base rate with reference to the possible factors. Only four factors were found to have a significant effect.

Currently, private hospitals have higher average base rates than charitable or public establishments. As a result, the ratings of the private hospitals, which are currently good, will tend to deteriorate by 2010. In this respect it is not possible to differentiate between private and charitable hospitals. The size of the hospital (number of beds) is also a key parameter for explaining the amount of the base rate. The larger a hospital is, the higher is its base rate. The share of special items in a hospital's balance sheet also seems to result in a lower base rate. Apparently, hospitals which have received higher subsidies to date do not

require such a high budget. Small hospital chains also have lower base rates than individual hospitals.

3.3 Selected Sub-Groups

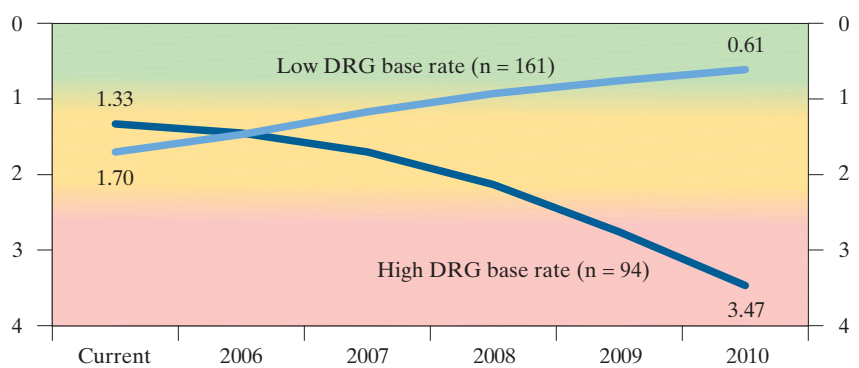
In contrast to the investigation of individual features, this section deals with individual groups of hospitals in greater detail. Reference is made in this connection to the typical hospital of a group, for example a typical private hospital. In this case, for example, the characteristic of "private" is not investigated separately but the analysis allows the possibility that a private hospital may be distinguished from non-private hospitals by other characteristics, too, such as a higher base rate. The other factors are not set to average values; in other words, the effects of the factor investigated are not isolated. The basis for the forecast of the probability of default of a selected group is therefore the group-specific weighted bundle of all its characteristics. It is not possible to draw conclusions as to causal relationships and the relationships presented are purely descriptive. However, they do give an impression of the possible development of certain groups of hospitals.

The most important investigation is probably the comparison of hospitals with high and low base rates (Figure 33). Hospitals with a high base rate get off to a relatively good start, with a probability of default of 1.3%. However, by the end of the convergence phase, these hospitals are well into the red zone, with a PD of 3.5%. The capping limit has been taken into consideration here. During the same period, the equity ratio is expected to fall from slightly more than

Figure 33

Despite capping, significant deterioration with high base DRG rate

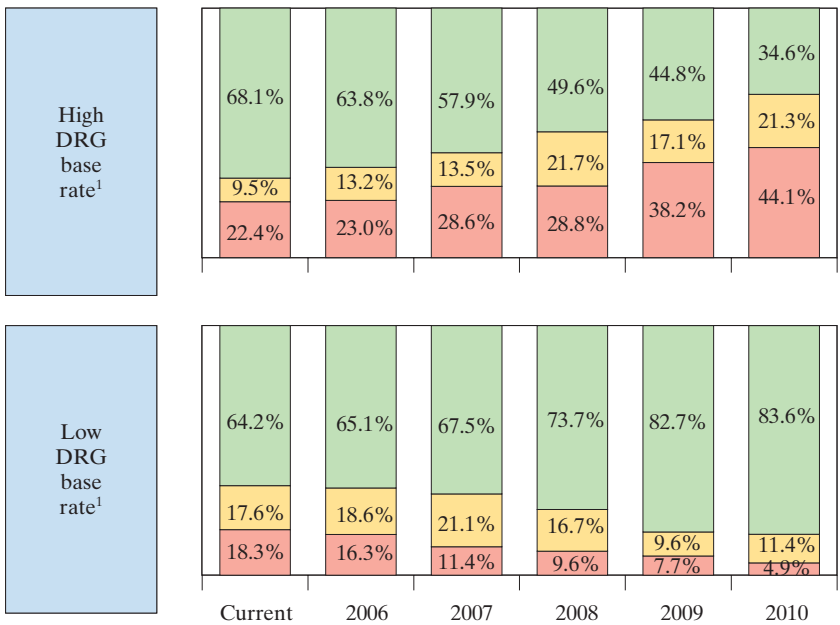
Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 34

Considerable increase in hospitals with high DRG base rates in the red zone



Analysis by ADMED and RWI Essen after Moody's (2001). – [1]Base rate above below state average.

20% to 9%, with return on sales deteriorating from –0.8% to –5.3%. The number of hospitals in the red zone is predicted to grow to more than 40%, with the number in the green zone shrinking to 35% over the same period (Figure 34). The hospitals concerned will therefore face a considerable need for adjustment.

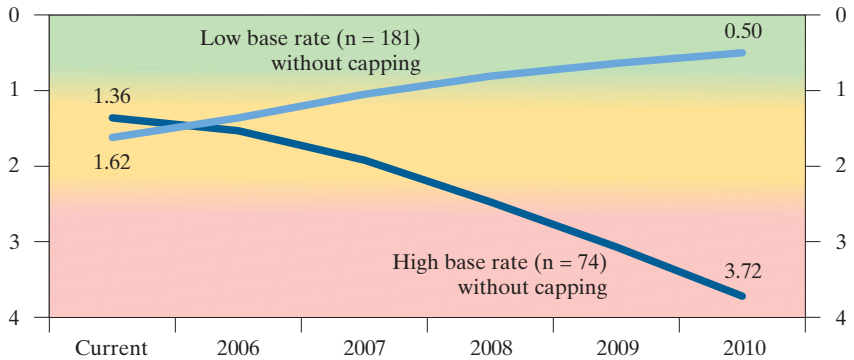
The situation with regard to hospitals with below-average base rates is completely different. Their poor starting point will very probably become an advantage. In the basic scenario, this group of hospitals will rapidly move into the green zone, with a PD falling to only 0.6% over the period considered. The equity ratio will grow from less than 20% to 30%, with return on sales improving from –2.0% to +2.9%. The number of hospitals in the red zone will shrink to the almost negligible figure of 5%. There is only a slight change if demographic developments are taken into consideration. In this case, the probability of default in 2010 will be 4.0% for hospitals with a high base rate and 0.8% for those with a low rate.

The cap will protect certain hospitals from extremely severe downward adjustment. However, when the cap is lifted, the state base rate could rise,

Figure 35

Without capping only slight changes compared to scenario with capping

Expected probability of default in%

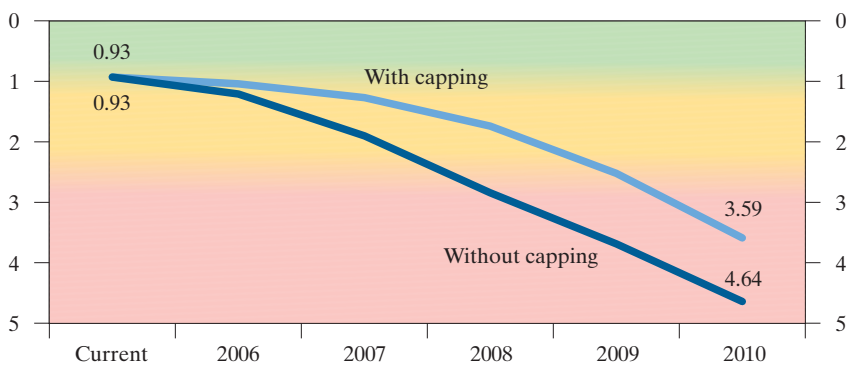


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 36

Only a few hospitals will be affected by capping[1]

Expected probability of default in%



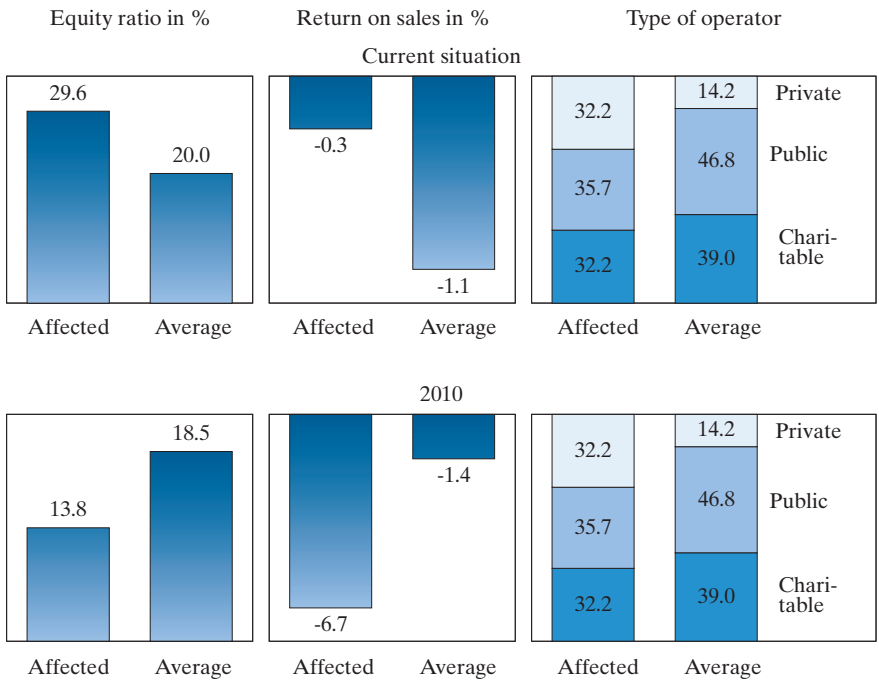
Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains. – [1]The converged Base rate is at least 1% higher than the state base rate in the case of 26 balance sheets.

increasing the number of "winners". Nevertheless, capping will end after the convergence phase and, therefore, roughly the figures shown in Figure 35 without capping are to be expected by 2010.[14] Capping is likely to favor about

[14] Without the capping limit, hospitals with high base rates would lose more revenue and those with low rates would gain more revenue. This means that the state base rate could be higher without capping than with capping. This is the reason why there are slight differences between the values shown in Figure 35 and Figure 33.

Figure 37

Characteristics of hospitals affected by capping



Analysis by ADMED and RWI Essen. Weighted by revenues; outliers (1st and 99th percentiles) are excluded; without large hospital chains.

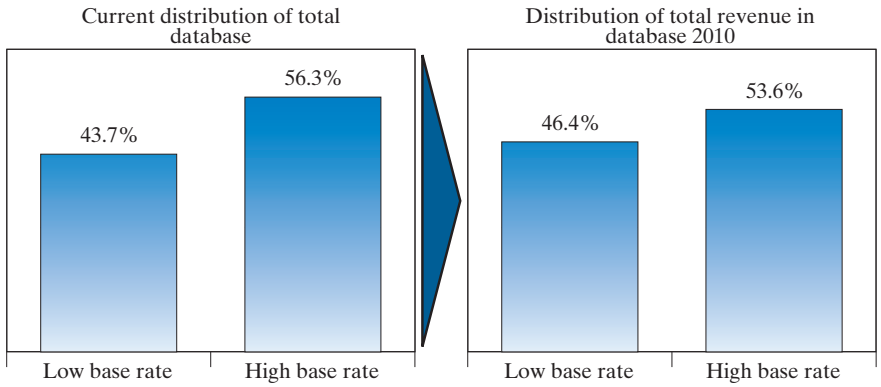
10% of the hospitals in our database.[15] With capping, we expect a PD of about 3.6% and without capping about 4.6% for the hospitals which are favored (Figure 36). Currently, these are economically successful hospitals with a PD of only 0.9%. Compared with the average, these tend to be private hospitals with an equity ratio of 30% and a return on sales of –0.3% (Figure 37). By 2010, the relative advantage of these hospitals will have become a disadvantage.

However, it would in our opinion be wrong to call the DRG flat rate system into question in view of these results. As already mentioned, the principle behind the new payment system is "comparable payments for comparable services", at least within one state. Hospitals favored by high budgets in the past have not automatically acquired the right to be favored in the future, too. Of

15 This includes hospitals with base rates at least 1% above the state base rate at the end of the convergence phase. If hospitals with rates between 0% and 1% above the state base rate are included, the share of hospitals favored by capping rises to almost 13%.

Figure 38

Moderate redistribution of about 2.7% of total revenue



Analysis by ADMED and RWI Essen.

course, this does not exclude the possibility of adjustments to the DRG flat rate catalogue. It should also be pointed out that the overall redistribution of the budgets is relatively moderate. The "winners" in the convergence phase currently account for 43.7% of the total budget. By 2010, we only expect this figure to rise slightly, to 46.4% (Figure 38).

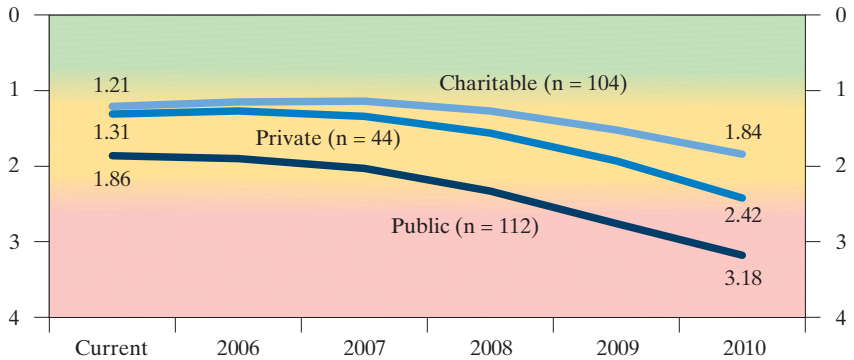
Nevertheless, one may well ask why the price of a service needs to be the same at all hospitals. In other sectors, this principle does not apply. In our opinion, the most important advantages of the DRG system are, firstly, the standardization of services in the form of DRGs, ensuring comparability, and, secondly, the creation of a standardized starting point for all hospitals, ending unequal treatment in the allocation of budgets, which may possibly have applied before. The main advantage is certainly not the fact that all hospitals are to charge the same price for the same service. On the contrary, we are in the favor of price deregulation following the convergence phase.

The following forecasts for selected groups also include revenues and costs in connection with demographic developments in addition to DRG convergence. Figure 39 shows the expected PD by types of operator. Charitable and private hospitals start roughly at the same level, and public hospitals in a significantly worse position. Of all three groups, public hospitals have the poorest prospects. However, the private hospitals will lose their good rating by 2010 and almost be in the red zone. This is a result of their higher average base rate. It should be mentioned that Figure 39 cannot be compared with Figure 28. Figure 28 only shows the influence of type of operator on the rating; all the other factors have been set to the same level. In Figure 39, all the other factors

Figure 39

Poor prospects for public hospitals

Expected probability of default in%

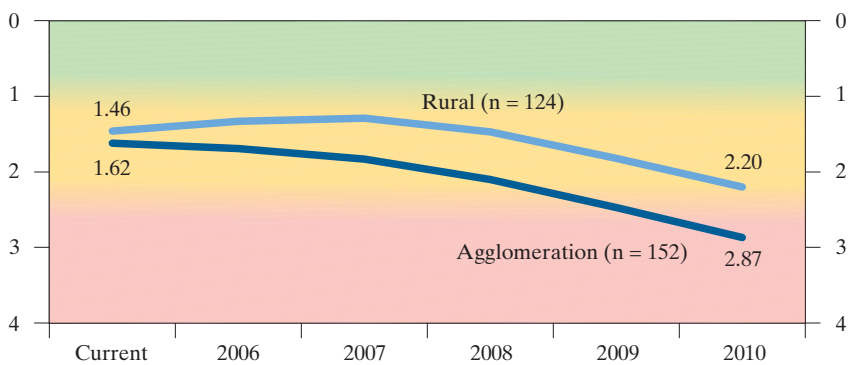


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 40

Deterioration of hospitals in agglomerations

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

have the typical values for their group, which may be different to the typical values of other groups.

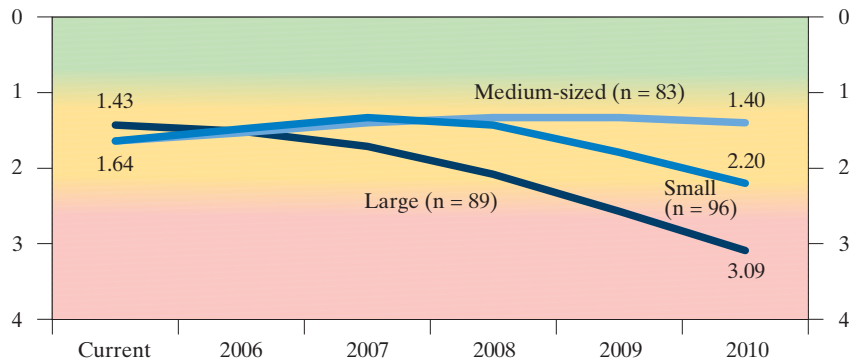
While a typical rural hospital[16] currently only has a slight advantage over hospitals in agglomerations, this advantage will probably increase significantly by

16 This also includes hospitals in towns with rural surroundings.

Figure 41

Large hospitals lose out, medium–sized hospitals gain

Expected probability of default in%

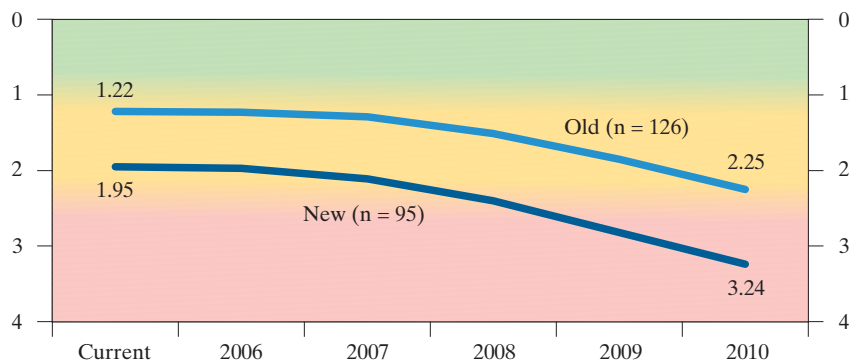


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains. "Small" = up to 249 beds; "medium-sized" = up to 449 beds; "large" = more than 450 beds.

Figure 42

No change in the relative positions of old and new hospitals

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). "Old" = 10 years old of older; "new" = up to 9 years old.

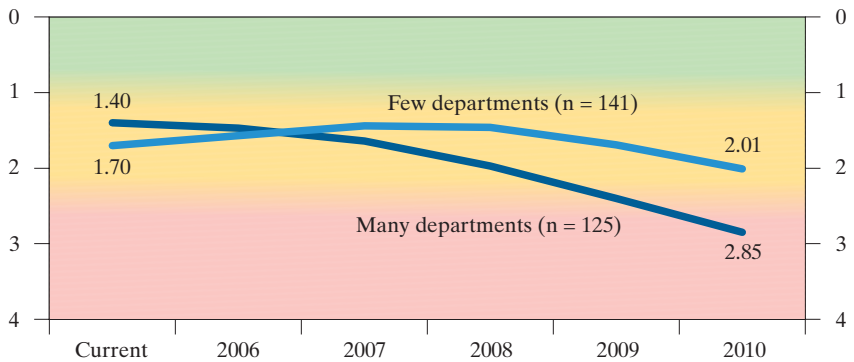
2010 (Figure 40). We therefore assume that the reduction in the number of hospitals will be less severe in rural areas than in conurbations. The risk to the availability of services is therefore not as great as it might seem at first glance.

Our calculations indicate that large hospitals will tend to be among the losers in the convergence phase (Figure 41). Compared with other hospitals, they start in a good position, but reach the red zone by 2010. Medium-sized hos-

Figure 43

Hospitals with many departments lose out

Expected probability of default in%

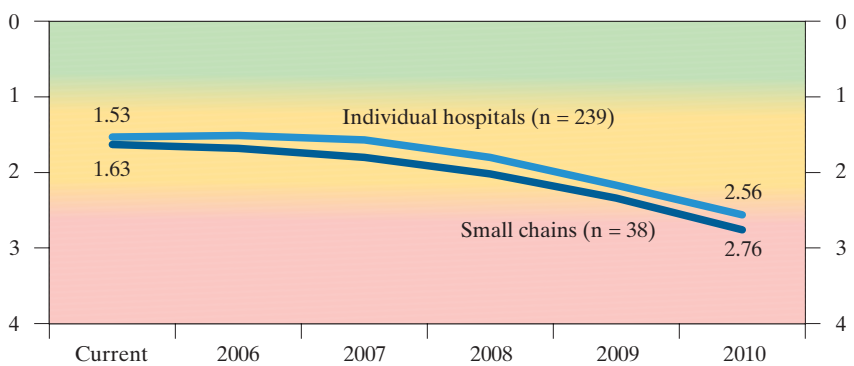


Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues; without large hospital chains; "few" = 1 to 5 departments; "many" = 6 or more departmens..

Figure 44

No change in the relative positions of individual hospitals and small chains

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

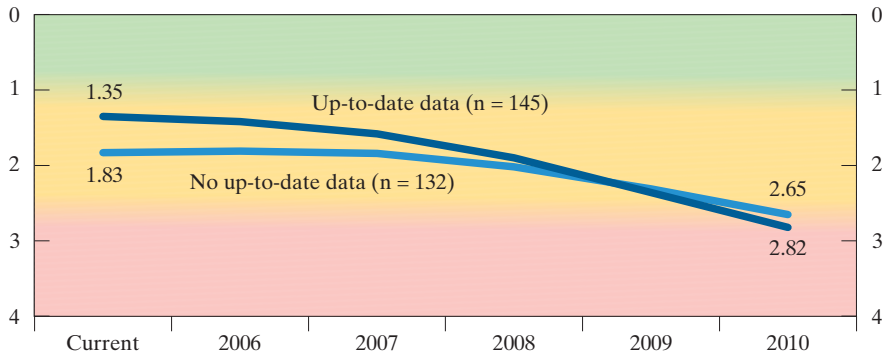
pitals improve their PD up to the end of the convergence phase and take up a good position. However, after a brief recovery, the situation of small hospitals will probably also deteriorate.

Older hospitals have a substantially lower probability of default than newer hospitals (Figure 42). This difference will change only slightly over the convergence phase. Hospitals with a large number of departments and a wide range

Figure 45

Hospitals with transparent data lose their advantage

Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large Hospital chains.

of services will be among the losers. Hospitals with few departments will be able to improve their position (Figure 43). This observation is closely connected with the development of large and small hospitals described above. Surprisingly, our analysis indicates that there will be no change in the relative positions of individual hospitals and small chains up to 2010 (Figure 44). Figure 27 does show that as chains they have a considerably lower base rate. However, they are also hospitals, which have a significantly higher base rate. In the final resort, the two effects apparently cancel each other out. Hospitals with up-to-date balance sheets, i.e. with greater transparency, will probably lose their advantage. By 2010, these hospitals will probably be approaching the group of hospitals with poor data (Figure 45).

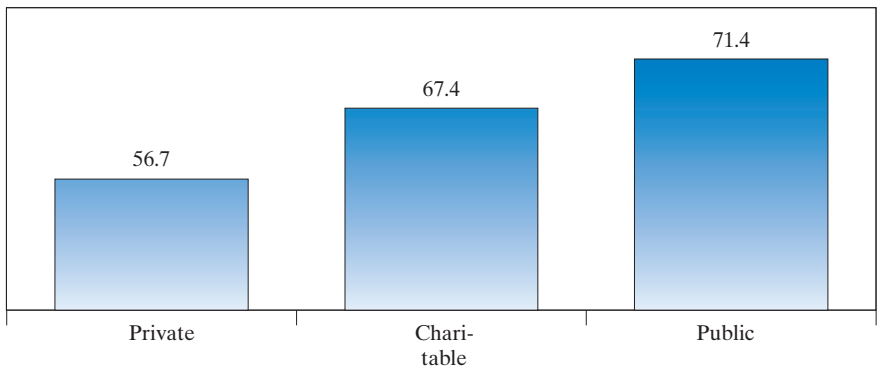
3.4 Special Features of Operators

Special attention must be paid to the different types of hospital operating organizations. They are a decisive factor in a sector of the economy characterized by growing efforts to ensure more competition. A comparison of ratings is only one of several interesting aspects. The following paragraphs deal with the differences between the staff and pension costs of private and other hospitals. One reason for the higher profitability of private hospitals may be the fact that their staff costs are lower. Staff costs in private hospitals only account for 56.7% of revenue, as against the significantly higher figure of 71.4% for public hospitals (Figure 46). Part of this difference can possibly be explained by the fact that private hospitals make greater use of outsourcing.

Figure 46

Private hospitals have the lowest staff costs

Staff costs as percentage of revenue (without other imcome)

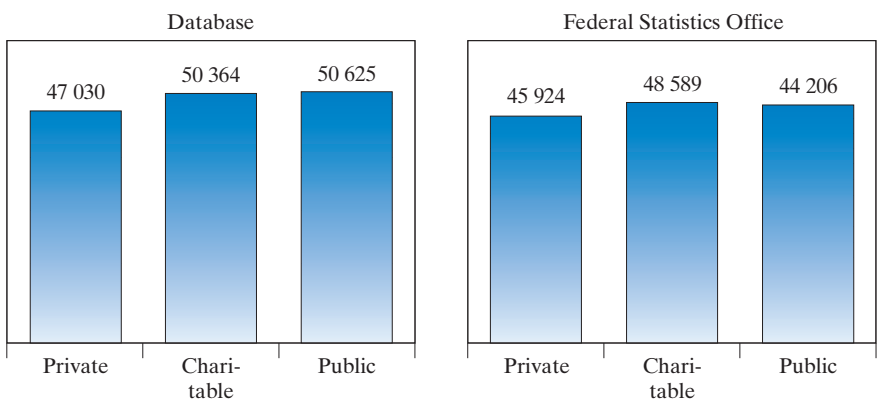


Analysis by ADMED and RWI Essen. Weighted by revenues, without large hospital chains.

Figure 47

Private hospitals have the lowest staff costs per full–time employee

in €

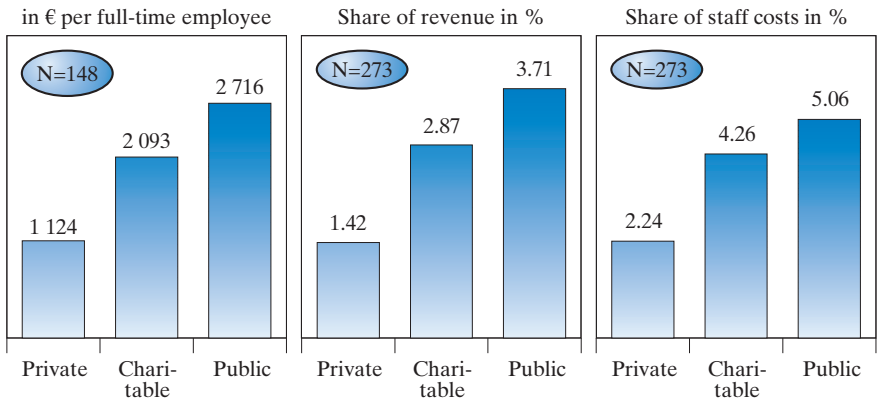


Analysis by ADMED and RWI Essen after data in Statistisches Bundesamt (2005a). Weighted by revenues, without large hospital chains, adjusted to full-time personnel (per operating body).

However, part of the difference is due to the fact that staff costs are actually 2,500 to 3,500 euros per year and full-time staff member lower than in other hospitals (Figure 47). This difference in turn can be explained at least in part by the lower pension expenses of private hospitals. Private hospitals pay an average of about 1,100 euros per full-time staff member and year, as against about 2,700 euros at public hospitals (Figure 48). Without the differences

Figure 48

Private hospitals have the lowest pension expenses

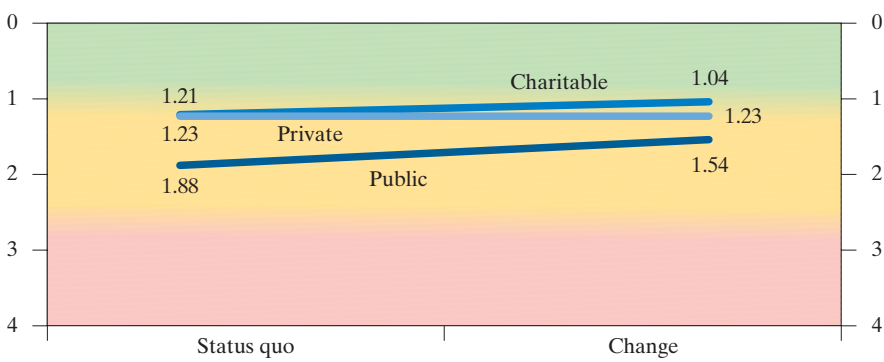


Analysis by ADMED and RWI Essen after data in Statistischen Bundesamtes (2005a). Weighted by revenues for averaging, without large hospital chains, number of employees in database adjusted to full-time personnel (per operating body).

Figure 49

Better rating for non-private hospitals with pension expenses of private hospitals

Expected probability of default in%

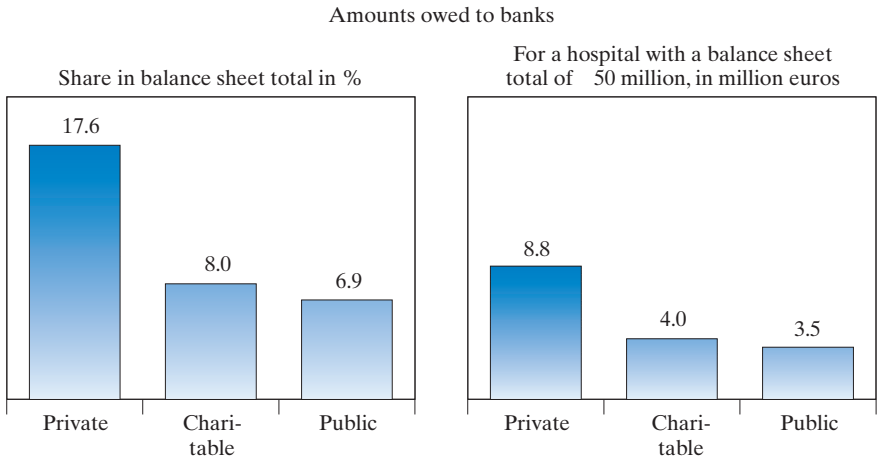


Analysis by ADMED and RWI Essen after Moody's (2001). The analysis is based on a hypothetical hospital in each group (using average figures for group from database).

between pension expenses, the difference between public and private hospitals in this respect would shrink to about 2,000 euros.

For an arbitrarily chosen hospital in our sample, Figure 49 shows how the rating of a charitable and a public hospital would change if they had the same pension contributions as a private hospital. Although there would be no change in the relative positions of public and private hospitals, the margin

Figure 50
Private hospitals with larger share of bank debt



Analysis by ADMED and RWI Essen. Weighted by reveneue (without outliers).

between the two types of operating organization would become narrower. It seems clear that, in addition to the more efficient performance of services by private hospitals, their lower staff costs account for a considerable part of the difference between the two groups.

Another difference is the extent of debt financing. An average private hospital with a balance sheet total of € 50 million has debts to banks totalling almost € 9 million (or 17.6% of the balance sheet total) (Figure 50). In the case of public and charitable hospitals, the share of debt financing is less than half this figure. There may be two explanations. The higher profitability of private hospitals makes access to private capital easier for them. Loans can only be taken up if the cash flow earned is sufficient to cover interest and the repayment of principal. Secondly, many non-private hospitals traditionally use state subsidies to finance their investments and do not attempt to complete investment projects with more flexible debt financing. However, in the future, creditworthiness will probably play a major role for all types of hospital.

4. Implications

Ten implications or recommendations for further action developed on the basis of the study are presented in this section.

4.1 DRG Convergence Will Achieve Its Objectives

DRG convergence will lead to a redistribution of resources within the hospital sector. The objective is to implement the principle of the same payment for

comparable services. As a result, the position of many hospitals will inevitably deteriorate, while that of others will improve. The rating of the sector as a whole should not change as a result. However, as a rating cannot be better than 0% but there is virtually no limit on bad ratings, there will be a fall in the average rating (i.e. an increase in the average PD) up to 2010. Within the group of the "winners", there will be very few hospitals in the red zone by 2010. The situation with regard to the "losers" is completely different. The number of hospitals in the red zone will probably increase to more than 40% by 2010.

It is also clear that the losers in the DRG convergence process will be the hospitals which received more favorable treatment in the past. However, the extension of the convergence phase and the introduction of capping in 2004 were adequate to prevent excessive hardship. In addition, the moderate redistribution of 2.7% of the total budget in favor of hospitals with a low base rate is no reason to criticise the process of DRG convergence. This does of course not exclude the possibilities of annual adjustments to the DRG flat rate catalogue. The new payment system is a learning system and will remain so in the medium term.

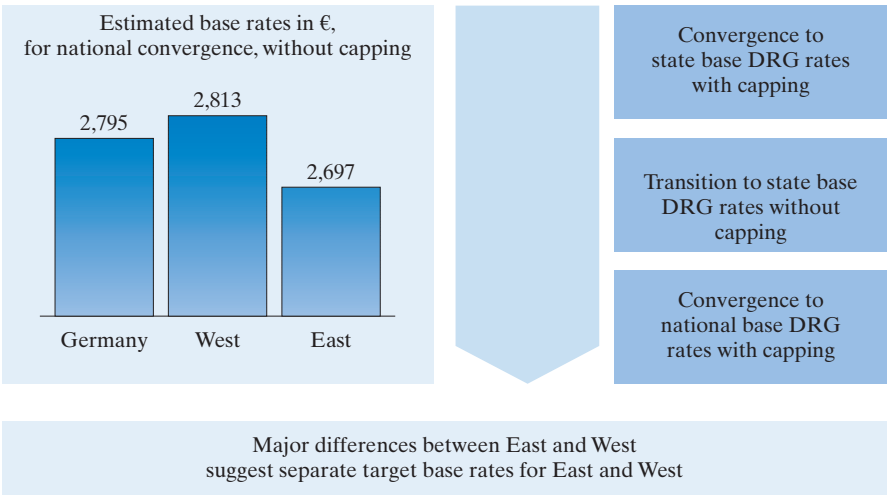
Despite this generally positive description, a state-regulated price system cannot be considered desirable from the economic point of view. Other sectors also have regional price differences for the same services as a result of local differences in supply and demand and diverging cost structures. In the long term, we therefore support the idea that prices should be deregulated. However, the DRG flat rate system in our opinion offers an excellent way of achieving this objective. It standardizes services, laying essential foundations for the creation of transparent competition, eliminates former inequalities in budget distribution and establishes a level playing field as a starting point.

4.2 National Convergence Should Follow Rapidly

The possibility of a national convergence process to follow state convergence has frequently been considered. Assuming that the principle is comparable payment for comparable services, this certainly makes sense. It would be appropriate for national convergence to follow state convergence more or less directly. From our point of view, it would be better for prices to be deregulated following state convergence. Nevertheless, the consequences of national convergence are briefly outlined below.

In view of different cost structures and the generous subsidy policy in the past, it may be decided to implement separate convergence processes for the East and West of Germany. We have therefore added separate forecasts for a five-year convergence process in East and West following the state conver-

Figure 51
National convergence following state convergence



Analysis by ADMED and RWI Essen. Berlin included in West.

gence stage to be completed in 2010[17]. We have assumed average base rates of 2,697 euros for Eastern Germany and 2,813 euros for Western Germany (Figure 51).

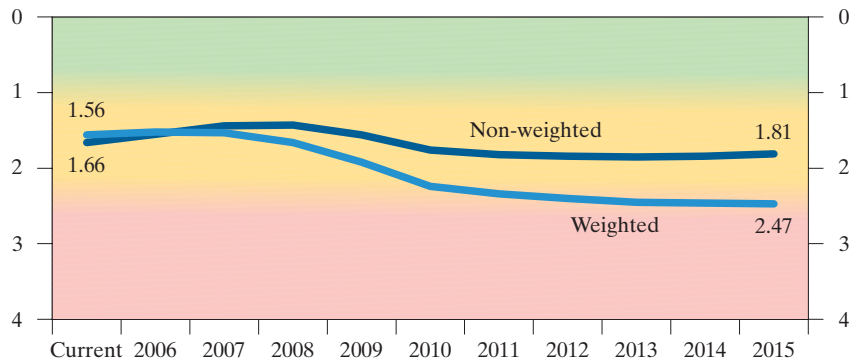
National convergence would not result in significant deterioration with respect to the average probability of default (Figure 52). However, there may be undesirable distortions. For example, many hospitals with an initially relatively high base rate in states with relatively low state base rates will suffer a loss of revenue in the state convergence process up to 2010. In the national convergence process that follows, they may well experience a rise in revenue again. On the other hand, winners in the state convergence process could well become losers of national convergence.

Of the hospitals in our database, 8% would probably win and then lose, while 25% could lose first, then win afterwards. Of these losers who became winners, 7% would gain revenue solely as a result of the elimination of capping following the end of the state convergence process and the ensuing rise in state base rates (Figure 53). In this case, a hospital could be forced to close by considerable loss of revenue during the state convergence stage and would then no longer be able to benefit from rising revenue during national convergence.

17 In view of its high state base rate, Berlin has been included in the Western German States.

Figure 52

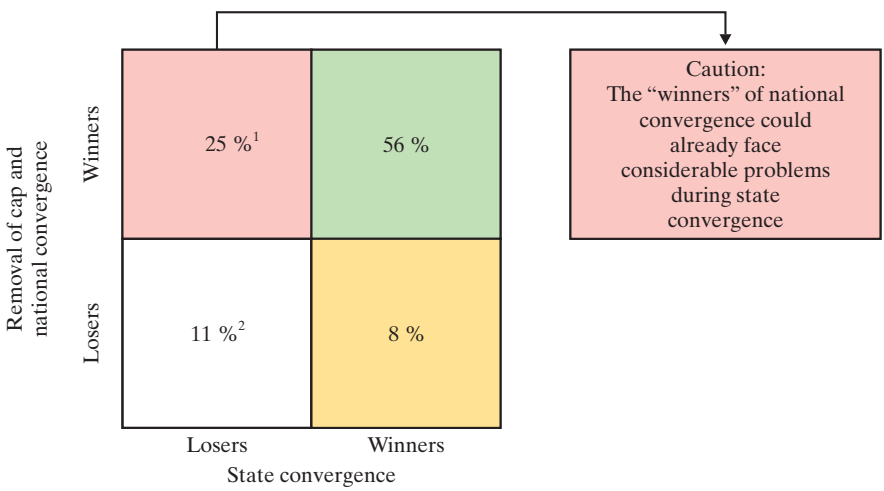
No significant change in probability of default as a result of national convergence
Expected probability of default in%



Analysis by ADMED and RWI Essen after Moody's (2001). Weighted by revenues, without large hospital chains.

Figure 53

Unified national convergence following state convergence causes distortions



Analysis by ADMED and RWI Essen. – [1]7% do not win as a result of national convergence but as a result of the switch to state convergence without capping. – [2]Including 8% which do not reach 100% convergence as a result of capping.

If national convergence is to be considered for political reasons before prices are deregulated, we support the introduction of national convergence before 2009 (i.e. before state convergence is completed) in order to avoid distortion.

This would also have the effect of greatly improving planning security for hospital managements.

4.3 Market Consolidation Improves System Efficiency

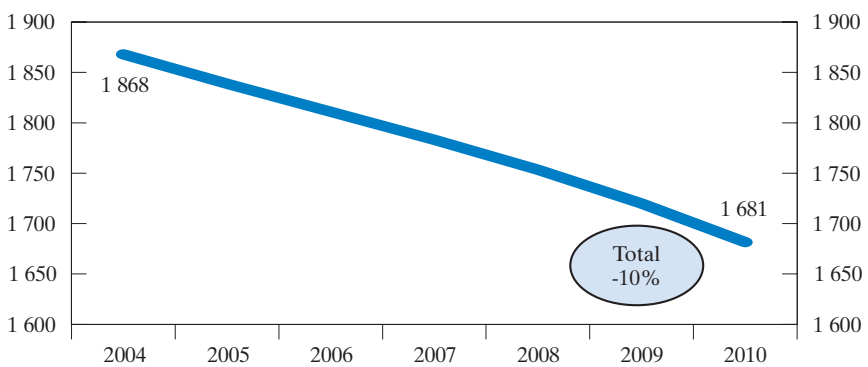
If the projected probabilities of default in fact materialize, about 10% of German hospitals will have disappeared from the market by 2010 (Figure 54). However, in contrast to other sectors of the economy, hospital failures and insolvencies will not always mean that a hospital is closed down completely. Political influence could lead to the merger of some of the problem hospitals with other institutions or their use for other functions in connection with rehabilitation or nursing care.

However, we do not see market consolidation in a negative way but as a process connected with the enhancement of quality and efficiency. In general, there is nothing unacceptable about the disappearance of businesses which either manufacture products for which there is insufficient demand or which operate less efficiently than their competitors. In a market economy which needs to adapt continuously to a changing environment, this is an important and essential process. Even in catastrophe and emergency medicine, the deployment of scarce resources is clearly governed by the process of "triage". To ensure improved prospects of survival for as many patients as possible, the treatment capacity available is focussed on those patients whose prospects of survival are most likely to be improved by treatment.

Figure 54

10% of hospitals are expected to close by 2010

2004 to 2010; number of general hospitals

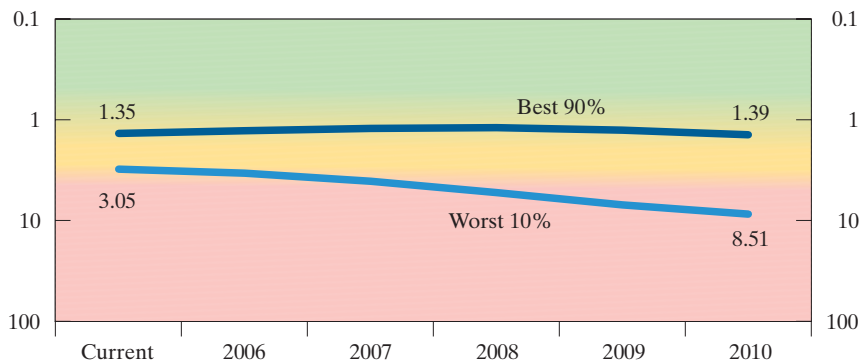


Analysis by ADMED and RWI Essen.

Figure 55

Hospitals would be in a better position without the 10% of worst institutions

Expected probability of default in%; log. scale



Analysis by ADMED and RWI Essen after Moody's (2001). Szenario 1.

Without the 10% of "worst" hospitals, the average probability of default would only be 1.35% and would scarcely change up to 2010[18] (Figure 55). The remaining 90% of hospitals could even benefit from market consolidation, if they took patients who would otherwise have been treated at the hospitals which were forced to close. The system as a whole would benefit because the patients transferred could be treated more cost-effectively in the remaining 90% of hospitals. A sample hospital with a PD of 1.34% could even improve its PD by almost 0.2 percentage points as a result of improved capacity employment. If we take a closer look at the 10% of worst hospitals, we find that a disproportionate number are public institutions located in agglomerations and have an above-average size (Figure 56).

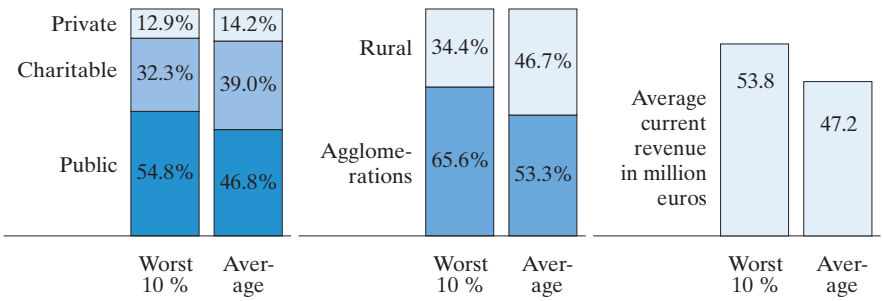
If the 10% of worst hospitals were closed, this would considerably relieve the burden on the hospital sector. According to our calculations, these hospitals record an (extrapolated) annual loss of about 1.6 billion €. The cost to the organizations which operate these hospitals (mainly local authorities) would be reduced by a corresponding amount. The total revenue of these hospitals is about 6.7 billion euros. If the patients who would otherwise have been treated by these hospitals were transferred to the remaining 90%, these remaining hospitals would not necessarily earn additional revenue in the same amount. Initially, these additional patients would result in higher capacity utilization

[18] For this purpose, we have considered the 10% of hospitals with the highest probability of default at the end of the convergence phase to be the "worst" hospitals. As the probability of default is a statistical figure, it is of course also possible that a "good" hospital (i.e., one with a low probability of default) could still fail. An analysis taking this aspect into consideration would be beyond the scope of this study.

Figure 56

Many of the 10% of worst hospitals are large public institutions in agglomerations

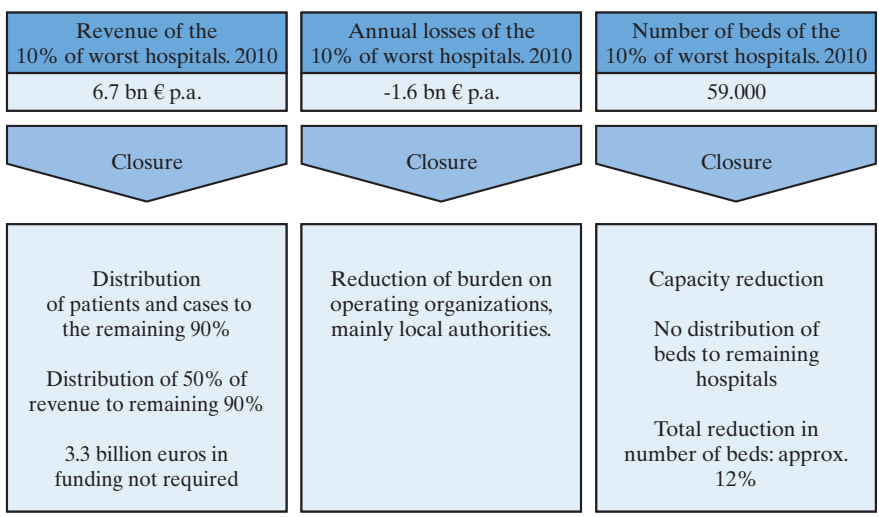
Composition of the 10% of worst hospitals[1]



Analysis by ADMED and RWI Essen. – [1]For 2010.

Figure 57

Closure of the 10% of worst hospitals reduces revenues and losses



Analysis by ADMED and RWI Essen.

and higher variable costs. Only part of the fixed costs would be incurred. We therefore assume that the remaining hospitals would only need about half of the additional revenue released for the treatment of additional patients. Total funds of more than 3.3 billion € would therefore be released. Finally, it would be possible to eliminate existing excess capacity. We estimate that the loss of

beds in general hospitals as a result of market consolidation could be of the order of 59,000 of the total of about 500,000 beds, or approx. 12% (Figure 57).

4.4 Market Consolidation Allows Monistic Financing and Reduces Burden on Public Purse

The Krankenhausfinanzierungsgesetz (Hospital Financing Act) introduced a "dualistic" financing system for hospitals in 1972. The principle is that the capital costs of hospitals are borne by the federal states, whilst operating expenses are covered by the health insurance schemes and private patients. Hospitals have to make an application for the provision of public capital by the states. In economic terms, a split of this type cannot be justified. Companies must be able to take independent decisions on future investments and the process from decision through to implementation must be sufficiently rapid and flexible to allow the company to survive in a competitive environment.

It is not least this "planned economy" approach that has led to the investment backlog in the hospital sector. Most of the players in the health system are aware of this fact and would approve of the adoption of a monistic financing system for hospitals. However, this approach cannot be adopted because the health insurance schemes would then have to fund the investments which are currently borne by the state. In view of the German labor market situation, an increase in health insurance premiums would be unacceptable. The funds required will therefore have to be obtained in another way or redirected from the federal states to the health insurers.

If consistent market consolidation were permitted, financing requirements could be reduced by about 3.3 billion euros from 2010. The funds released in this way could be used to include the subsidies currently provided by the state (of the order of 3 billion euros per year) in DRG payments. This would be a first, important step towards greater responsibility for resources and greater leeway for hospitals. The public sector would no longer have to provide investment subsidies of the order of 3 billion € per year or to bear the losses of uneconomical hospitals. We estimate that the total saving for the state would be up to 4.5 billion € per year.[19]

4.5 Security of Treatment Provision Not at Risk

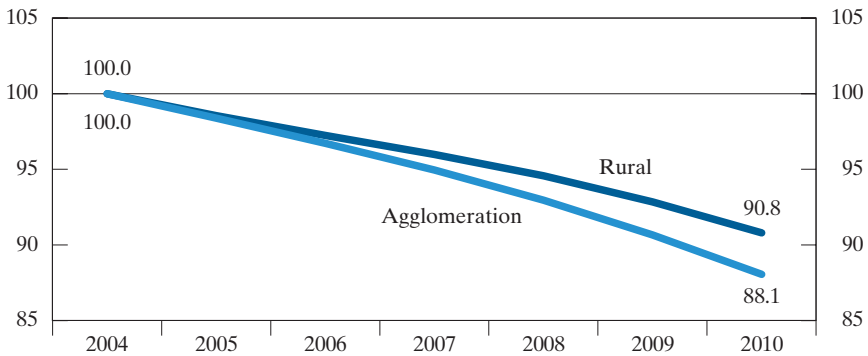
Decisions to close hospitals will be based mainly on economic criteria, which will not initially present a problem. On the contrary, the closure of uneconomical companies should be welcomed as the funds released, which are in

[19] In Augurzky et al. (2004c) we estimate the efficiency reserves of the health system at 7.5 to 10 billion €.

Figure 58

Rural hospitals will be affected less severely than those in agglomerations

Number of hospitals in scenario 1; 2004 = 100



Analysis by ADMED and RWI Essen.

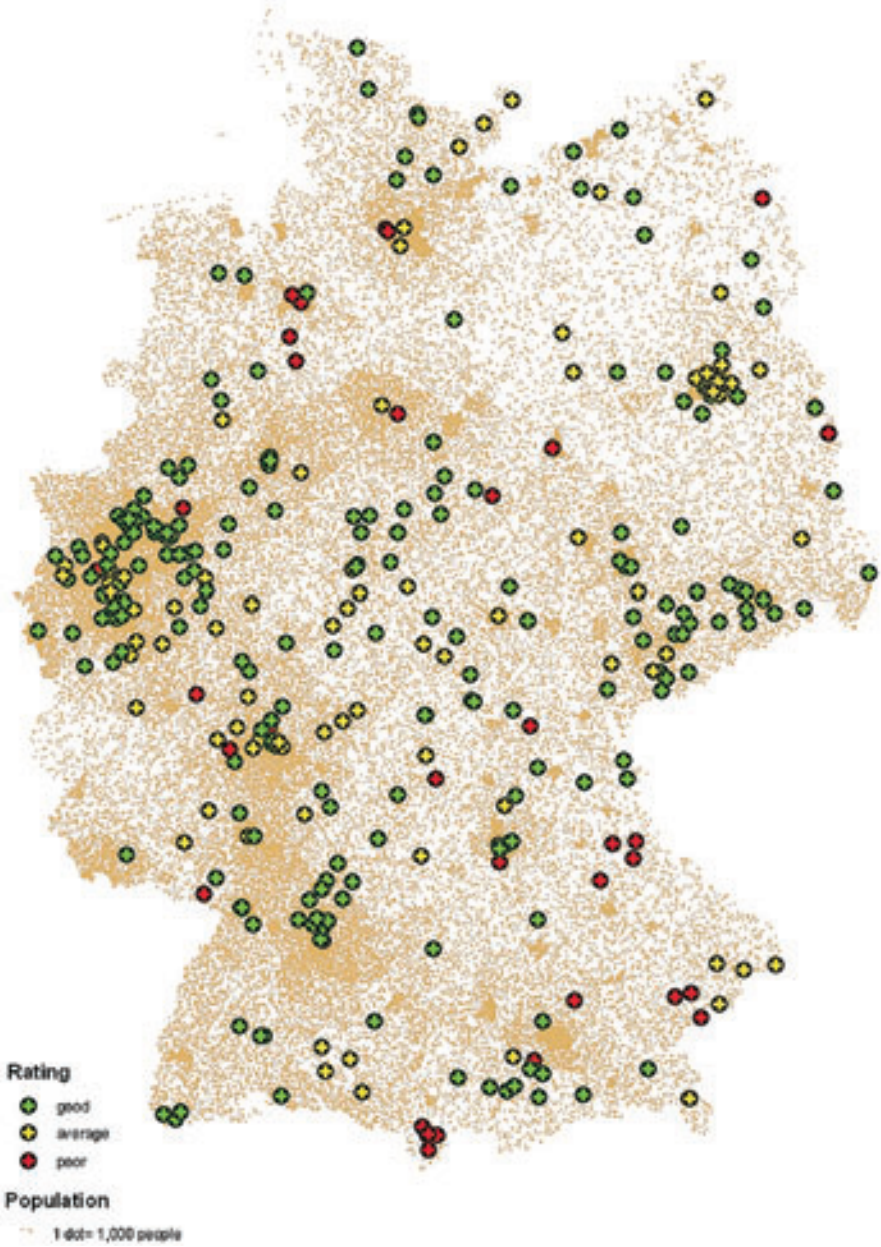
short supply, may be used more efficiently by the remaining companies. In a free market, supply shortages would not occur as other companies increase supply as prices rise.

However, as a result of price regulation in the hospital sector, hospitals cannot adjust their prices if the availability of treatment in a region deteriorates. This could possibly represent a risk to the security of treatment provision in rural areas. Nevertheless, we are of the opinion that this risk is less severe than is often assumed. On the basis of our calculations, the risk of hospital closure is less severe in rural areas than in agglomerations. We therefore expect that there will be a lower reduction in the number of rural hospitals (Figure 58). Maps 1 and 2 show the distribution of ratings among hospitals in our database in the current situation and the situation expected in 2010.

Nevertheless, the availability of hospital services is a matter that requires close attention. It is to be expected that patients in rural areas, especially in Eastern Germany, where the population is falling dramatically, may have to travel greater distances to the next hospital. This will apply especially if the expected trend towards greater specialization among hospitals in fact materializes. On the other hand, patients will probably benefit from higher-quality treatment as a result of greater specialization. The possible risk of supply bottlenecks can be generally avoided if hospitals in rural areas redefine their roles, for example as gateway clinics within a hospital group.

Map 1

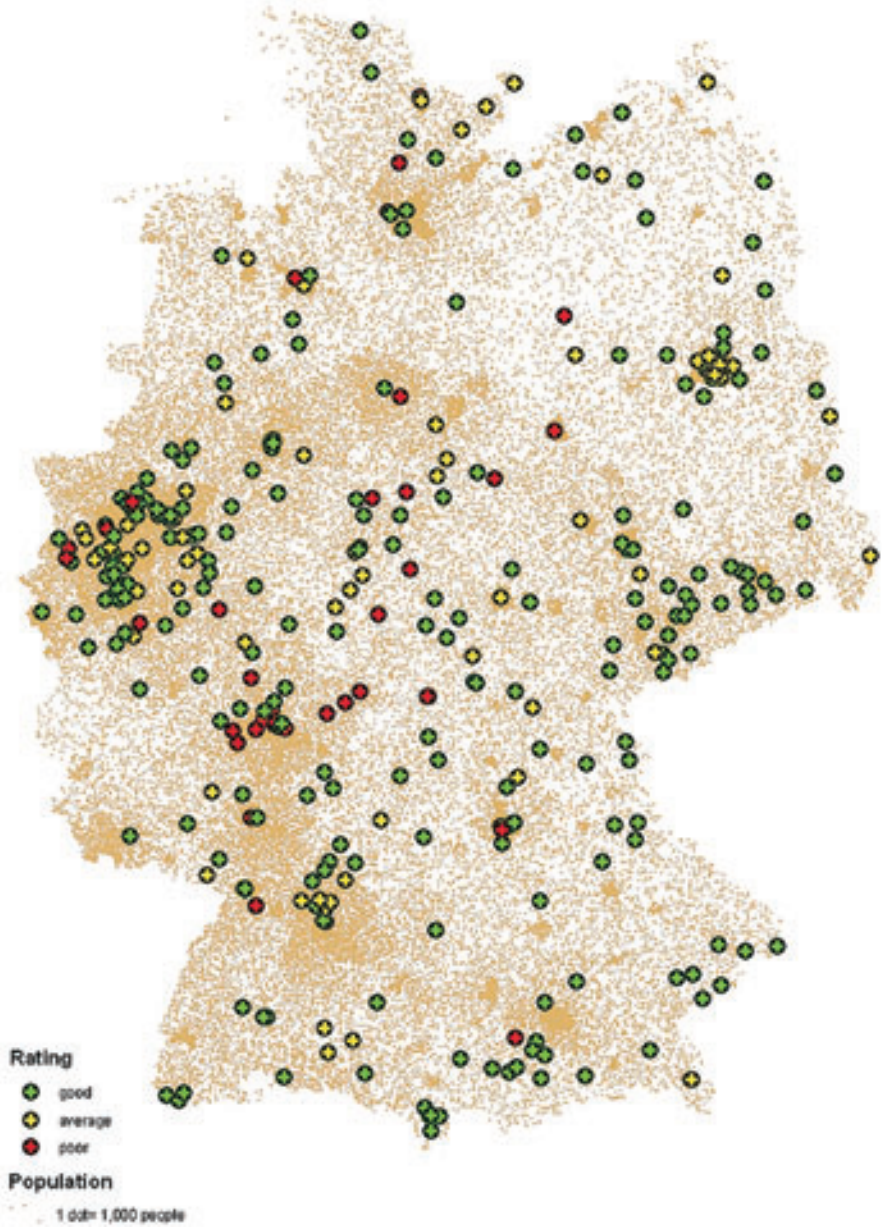
Regional distribution of hospitals in the database with classification by traffic light system
Current situation



Analysis by ADMED and RWI Essen.

Map 2

Regional distribution of hospitals in the database with classification by traffic light system
2010



Analysis by ADMED and RWI Essen.

4.6 Hospitals Should Benefit from Greater Freedom

The introduction of a monistic financing system would give hospitals considerably more leeway. The end of budget capping would present greater problems. As there will be no scope for contribution increases by the statutory health schemes in the future, the end of capping must not lead to higher expenditure by these schemes. The statutory nursing care insurance and pension insurance schemes will be faced by growing financing requirements; as a result of the ageing population, they will face even more severe problems than the health schemes.

In order to allow more freedom for hospitals despite this situation, mechanisms to limit demand must be incorporated into the system. The deregulation of DRG prices, or at least the base rate, would be an important step in this direction. To limit demand, for example, a system similar to that already adopted in the drugs sector could be used. Pharmaceutical companies are free to set the prices of their products but the statutory health schemes only pay a fixed maximum rate, a reference price, for each drug. The patient must bear the difference between the reference price and the market price of the drugs. Action is taken to ensure that there is always an adequate selection of drugs with prices below the reference price in each case.

Transferred to the hospital sector, this would mean that patients would need to obtain information on the cost of treatment either from various hospitals or from their health insurance scheme and then to decide where they wished to be treated. Hospitals would face a considerable incentive to offer a high quality treatment at low prices. In view of increasing transparency in the medical sector we believe that patients are sufficiently mature to assume more responsibility. Conceivably, a number of other regulations could also be eliminated.

4.7 Outpatient Surgery Calls into Question Boundary Between Hospitals and Specialist Practices

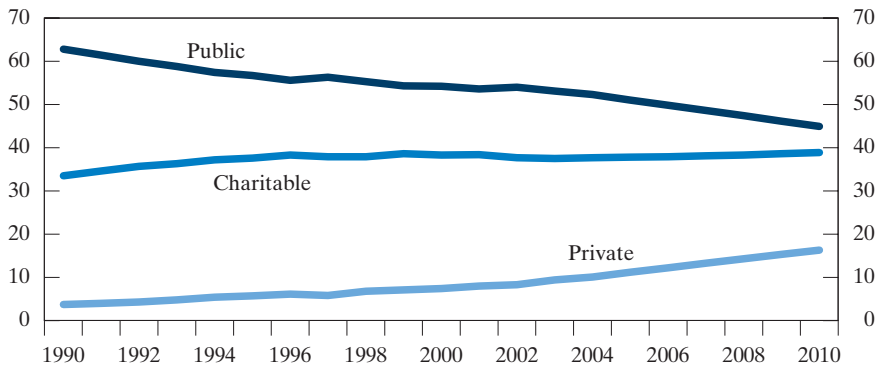
As the outpatient potential of hospitals is tapped more effectively within the next few years, it will be necessary to review the boundary between hospitals and specialist practices increasingly critically. Where outpatient operations are possible without sacrificing quality, they should be carried out for economic reasons. No one can afford to waste resources.

However, from the point of view of hospitals, outpatient surgery will initially result in a loss of revenue compared with inpatient treatment. There is therefore little incentive for hospitals to change in this respect. There is even a risk that operations which would previously have been performed on inpatients at hospitals will be transferred to specialist practices as outpatient oper-

Figure 59

Distribution of general hospital beds by type of operating organization

in %



Analysis by ADMED and RWI Essen on the basis of information in Statistischen Bundesamt (2005a). Assumptions made for forecast: calculated probabilities of default and a privatization rate of 2% p.a. for public hospitals.

ations. This will lead to closer links between the specialist practice and hospital sectors, a development which is generally to be welcomed. However, conditions for fair competition at this interface must be established. We therefore support the demolition of the boundary between the hospital and specialist practice sectors, the consistent development of outpatient treatment and competition between specialists in hospitals and specialist practices.

4.8 Public Hospitals Will Lose Their Dominant Position

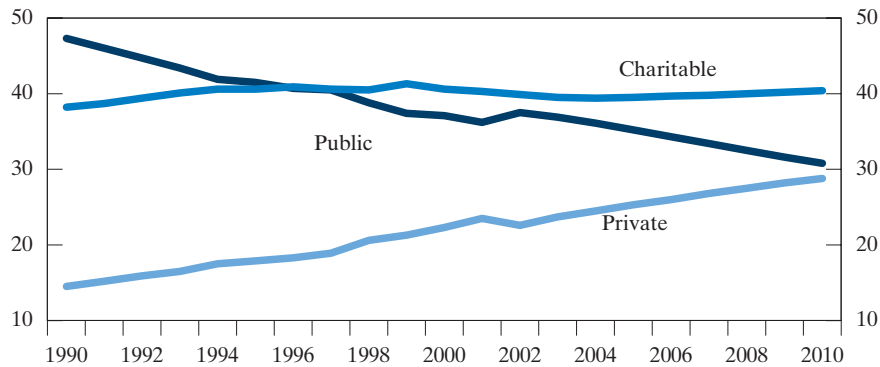
At the beginning of the 1990s, public hospitals accounted for 63% of general hospital beds. Since then, public hospitals have lost part of their lead, but still account for more than half of general hospital beds (Figure 59). As regards the number of hospitals, the charitable segment overtook the public segment at the end of the 1990s (Figure 60) and there has been a significant rise in the number of private hospitals. On the basis of the probability of default calculated and the fact that further public hospitals are expected to be privatized[20], this trend is likely to continue. If 2% of public hospitals are privatized each year, there will be as many private as public hospitals by 2010. The public sector will then account for less than 50% of the number of beds available. However, we do not expect a significant number of charitable hospitals to be privatized.

20 In this case, "private" refers to the type of operating organization and not to the legal form of the organization (private company, etc.).

Figure 60

Distribution of general hospitals by type of operating organization

in %



Analysis by ADMED and RWI Essen on the basis of information in Statistischen Bundesamt (2005a). Assumptions made for forecast: calculated probabilities of default and a privatization rate of 2% p.a. for public hospitals.

Despite these developments, it is important to remember that there are also some very well positioned public hospitals with professional management. For example, the formation of the "Interessenverband kommunaler Krankenhäuser e.V." has created Germany's largest de facto hospital group. It remains to be seen whether such developments will have an effect on the privatization rate, especially in the case of hospitals providing maximum service ranges. In addition, organizations operating public hospitals will need to find answers to the questions posed by pay agreements and complex decision-making processes.

4.9 Increasing Cost Pressures

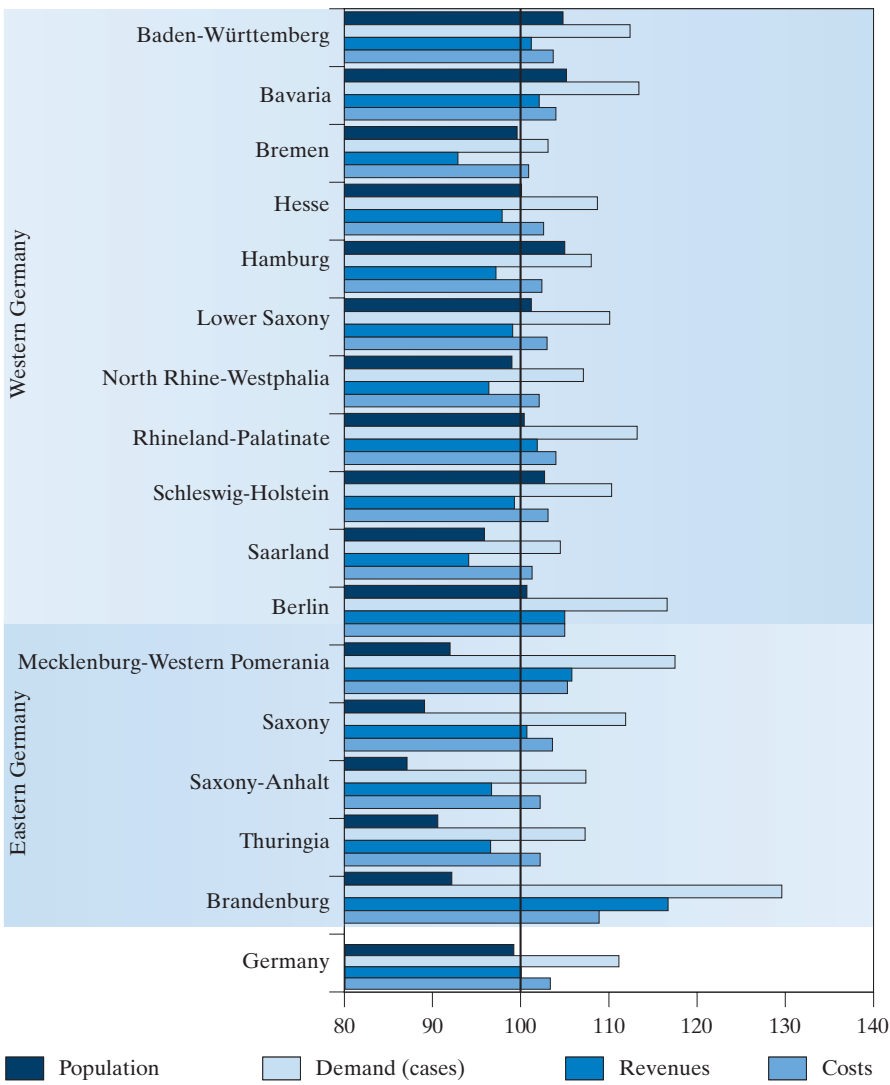
While the revenues of the hospital sector will remain largely unchanged in real terms up to 2010, it is expected that costs will continue to rise. On the one hand, demographic developments will lead to growing demand for hospital services. On the other hand, they will result in additional expenses for the treatment of additional patients. If we consider population developments, demand for hospital services, revenues and costs, the situation will vary from federal state to federal state and indeed even between individual hospitals.

Figure 61 shows the results at the level of the federal states. Up to 2020, there is expected to be significant population growth in Baden-Württemberg, Bavaria and Hamburg and considerable shrinkage in the Eastern states of Germany. Nevertheless, the increase in demand for hospital services is expected to be especially strong in the East, as a result of the extraordinarily rapid ageing of

Figure 61

Growth in demand as a result of demographic developments – revenues lag because of budget capping

Change up to 2020; 2004 = 100

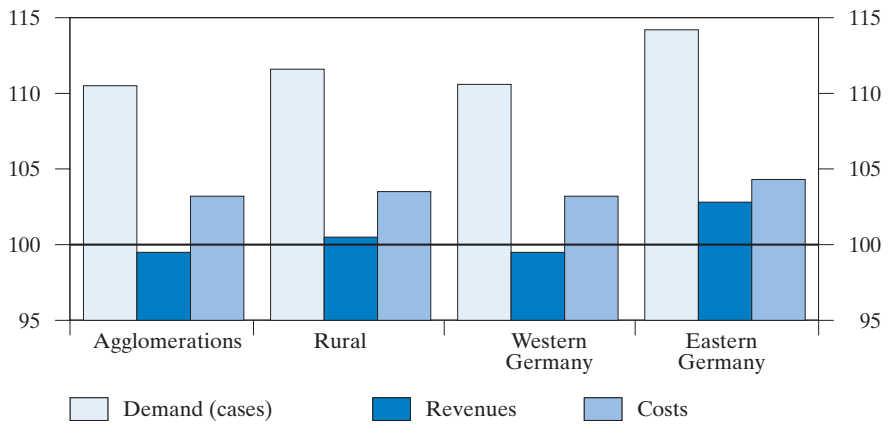


Analysis by ADMED and RWI Essen after Bundesverband für Bauwesen und Raumordnung (2005) and Statistisches Bundesamt (2005b). Changes in demand have been estimated on the basis of the composition of the age classes and the demand structure of the individual departments. The figures refer to the overall population of all hospitals; no weighting; it has been assumed that costs will be proportional to demand and that only variable costs (approx. 30%) will be incurred.

Figure 62

Very little difference between agglomerations and rural areas

Change up to 2020; 2004 = 100



Analysis by ADMED and RWI Essen. Cf. notes to Figure 61.

the population. However, hospital revenues will only rise where the increase in demand is above-average. As a result of budget capping, revenues will fall where demand only rises at a below-average rate. The situation with costs is completely different. Costs will rise as soon as there is an increase in demand.[21] We expect more severe cost pressure in the West than in the East. On the other hand, there will probably be no significant difference between rural areas and agglomerations in this respect (Figure 62).

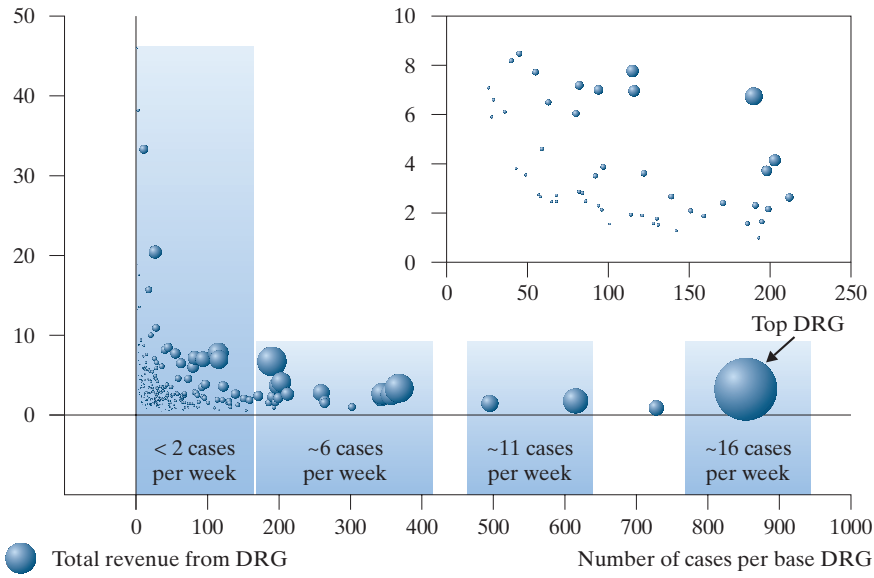
Staff costs, representing almost two-thirds of all hospital costs, will exert additional pressure. Competition for good doctors would be intensified by a possible growing shortage of medical practitioners. It would then be only a question of time before medical salaries would need to rise in order to make the medical profession more attractive and to counteract the migration of young doctors to neighbouring countries or other professions. The annual adjustments of across-the-border public pay agreements will not make the situation any better. As a result of these adjustments, personnel with lower qualifications may become too expensive. It is to be expected that the pay agreement will be broken up, allowing wider salary ranges and a greater focus on performance. However, this will be difficult to accomplish.

21 With growing demand up to 2010, it is assumed that variable costs will rise in proportion to demand and that the share of variable costs in total costs will be 30%.

Figure 63

Analysis of the medical portfolio (example)

Average revenue per DRG in thousand euros



Analysis by ADMED.

4.10 Hospitals Must Tap Their Efficiency Reserves

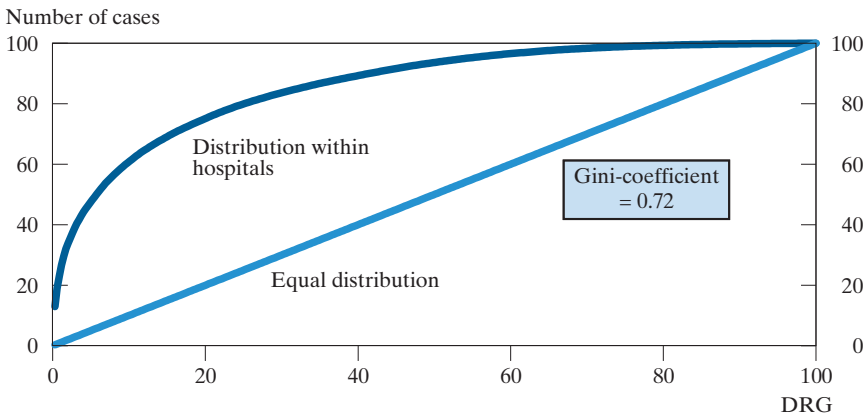
In view of these conditions, the economic situation will become critical, even threatening for some hospitals in the DRG convergence phase. There will be no additional public funding; the best that hospitals can hope for is additional private finance. In this situation, there is no alternative to efficiency enhancement measures within the hospital sector itself, both in the commercial and in the medical area. This must be reinforced by greater freedom for hospitals. A selection of possible measures is presented below.

The classical service portfolio of a hospital includes large numbers of patients in a few DRGs and a small number of patients distributed between a large number of DRGs (Figure 63). The average revenue per DRG is therefore very low. An unconsolidated service portfolio of this type entails a number of economic disadvantages. On the one hand, it is clear that it is only possible to gain experience with a particular service and perform it more efficiently if it is performed frequently. On the other hand, it is difficult for a hospital with such a diverse service portfolio to secure a good competitive position, especially in the perception of medical practitioners and patients, because no specialist expertise is evident.

Figure 64

Concentration of DRGs: 25% of DRGs account for 80% of cases (example)

Lorenz curve; in %



Analysis by ADMED and RWI Essen.

One way to measure the concentration of the DRG service portfolio is the use of the Gini coefficient (Figure 64). This coefficient measures the relative deviation of a given real distribution from equal distribution. It is used, for example, in the analysis of income distributions. The value of the coefficient may be between 0% and 100%; the higher the value, the more unequal or concentrated the distribution. In this case, a coefficient of 0% would mean that a hospital's services were equally distributed between all the DRGs. This coefficient is suitable for a first rough assessment of the service portfolio.

In many regions of Germany, there is a high hospital density. Frequently, we find hospitals offering similar services in the same densely populated area, in some cases within existing hospital groups. Often, there are redundancies within the medical service range, with the same services available from institutes only a few kilometres apart. The restructuring of a regional cluster, a stronger focus within the service portfolio and the creation of centres promote the establishment of efficient structures.

A tendency towards outpatient surgery and a reduction in the average duration of hospital stays will increase the pressure (i) to adapt capacities, as regards locations, technology and personnel and (ii) to adapt organizational structures and procedures. Case studies show that many construction projects which do not take these developments into consideration are being planned in the hospital sector. Many of these projects are oversized and implementation would lead to unnecessarily high operating expenses.

Finally, in addition to investment subsidies, conventional bank loans and alternative financing possibilities such as mezzanine capital or factoring will become increasingly important. Hospitals should therefore pay attention to their creditworthiness when obtaining new capital for investments. In the previous study (Augurzky et al. 2004a) we presented various measures for improving the rating of a hospital.

5. Conclusions

In our opinion, the rating of the hospital sector can be considered to be mediocre. The average probability of default is approx. 1.7%, which is higher than for other medium-sized enterprises in Germany. The situation cannot be expected to improve over the next five years as hospitals are required to adapt to changing conditions which may have a detrimental effect on them. The average effects of DRG convergence will not be severe, although it will mean the end for a number of hospitals suffering from severely reduced revenues which are not capable of adjusting in good time. Over the next five years, the ageing of the population will lead to increased demand for hospital services. However, budget capping will mean that revenue will not increase in line with demand. Increases in nursing care and pension insurance contributions will be given priority in political discussions as the problems faced by these schemes are even more severe than those of the health insurance schemes.

Although it makes sound economic sense, outpatient surgery will initially lead to a loss of revenue on the part of hospitals. It will only be in the long term that hospitals will succeed in adjusting, reducing their inpatient infrastructure and benefiting from outpatient surgery. In view of the parlous state of public finances, the decline in state subsidies is expected to continue, forcing hospitals to access new sources of funding. Apart from conventional bank loans, there are also private investors, subordinate loans and possibly even public private partnerships. Against this backdrop, the creditworthiness of a hospital will play a more important role than in the past, especially if operating bodies cease to provide guarantees or assume liability. Rising staff costs, possibly caused by a shortage of medical practitioners, will increase the pressure to rationalize. All in all, the economic situation of the hospital sector looks set to deteriorate drastically by 2010. Over this period, the average probability of default could rise as high as 4%.

There are two aspects which may be seen to relieve this extremely pessimistic outlook. Firstly, this scenario is based on the assumption that hospitals will be entirely passive and does not take into consideration any measures which may be taken by hospitals to compensate for these developments. However, many hospitals are already adapting their organizational structures and procedures to the challenges of the future and will therefore be able to escape the

downward trend. The other hospitals will have to follow suit within a short time as a result of the pressure to adapt or will find themselves forced out of the market. Secondly, consideration of the average hospital may lead us to forget that about two-thirds of hospitals are currently in the green zone and that many of them are operating profitably. Private hospital chains or charitable hospitals could serve as an example here. Private investors are convinced that it is possible to record earnings with the difficult "product" of health. A glance behind the scenes shows that there are a large number of currants in the cake of the German hospital market and that considerable efficiency potential is there to be tapped.

In order to give hospitals which are in poor economic condition but willing to change a chance, there is a need for a certain change in the mentality of politicians. Politicians are called upon to establish conditions in which hospitals can be freed from their regulatory and planned economy burden. One of the main aspects in this connection is the freedom to decide on investments and on the price of the services offered. If hospitals are given more responsibility for the resources they use, an entrepreneurial way of thinking and acting will become more widespread, enhancing the efficiency of the system. However, price deregulation need not lead to rising prices if, as in other deregulated sectors, the price system includes effective mechanisms to limit demand, such as greater participation of patients in the cost of their treatment. However, such developments will mean that hospitals, just like other business operations, will be exposed to the risk of failure.

It will be possible to lay the foundations for and finance a monistic system of hospital financing by transferring the responsibility for investment decisions to the hospitals themselves if a consistent decision is taken to allow economically inefficient hospitals to fail because they are no longer able to withstand competitive pressure. Resources will be released if patients who would otherwise have been treated by hospitals forced to close are transferred to other hospitals which have proved that they are able to offer treatment of the same quality using fewer resources. There is no reason to fear a dramatic thinning-out of the hospital landscape in this connection. We assume that this process of consolidation will lead to the release of funds totalling more than 3 billion € per year. On this basis, the DRG flat rates would finance not only hospital operating expenses but also investments in the future. The federal states would no longer need to provide the funds required for investment. In addition, the burden on hospital operators, especially local authorities, would be reduced by about 1.6 billion € per year.

More market economy and less planned economy in the hospital sector may give rise to concerns that patients may receive a poorer level of medical services in the final resort. However, we are convinced that these fears are

unfounded. Only a hospital with a good economic state of health can invest in new medical technology, innovative treatment methods and good personnel. In view of the competition for patients, no hospital can afford to offer poor quality services in such a sensitive field as health. Any hospital which did so would rapidly lose its patients to competing institutions. In addition, it appears that patients are prepared to travel further in order to obtain good treatment. On the other hand, hospitals are not free to refuse patients treatment that is necessary for medical reasons. Indeed, they are under a statutory obligation to provide patients with treatment. But, notwithstanding this obligation, patients are only accepted in the final resort if they have health insurance. This is normally the case in Germany.

6. Appendix

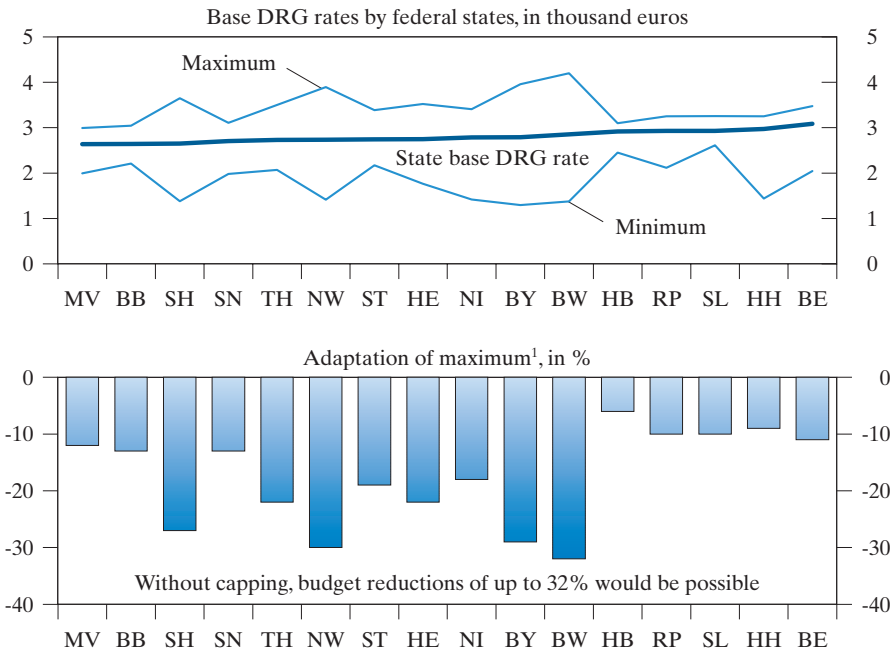
6.1 DRG Flat Rate System

In the past, hospitals individually negotiated their budgets with the organizations responsible for paying for treatment, the statutory health insurance schemes. Since the beginning of 2004, hospitals have faced an entirely new payment system. Each type of treatment is assigned to a diagnosis-related group (DRG). Each DRG, in turn, is assigned a relative weighting which determines the price of treatment. The price in each case is calculated by multiplying this relative weighting by the base rate of the hospital concerned. These base rates, which may be seen as the average price level of a hospital, vary from hospital to hospital. The base rate for 2004 was determined on the basis of the historical budget of each hospital; there was therefore no change in hospital budgets from 2003 to 2004. However, by 2009, the base rates of all the hospitals in a federal state are due to converge on the average federal base rate (*Krankenhausentgeltgesetz* (Hospital Payment Act) 2002, 2. Fallpauschalenänderungsgesetz (DRG Flat Rate Amendment Act) 2004).

Following the Gesundheitsstrukturgesetz (Health System Structure Act, 1993) and the Bundespflegesatzverordnung (Statutory Instrument Concerning Hospital Daily Rates, 1995), the DRG flat rate system is another step towards greater competition in the hospital sector, indeed the most important step in this direction taken to date. It is to be expected that further steps will be taken after 2009. For individual hospitals, the convergence of base rates will mean an increase or reduction in revenue, depending on their base rates at the start of the process. For some hospitals, the reduction in revenue up to the end of convergence may be as high as 30% (Figure 65). For the hospitals concerned, this would mean considerable pressure to adapt to the new conditions. For this reason, the legislation provides for a cap. Up to 2009, only a maximum

Figure 65

Cap alleviates the effect of DRG convergence, which could be disastrous for some hospitals



Analysis by ADMED and RWI Essen after AOK (2005). – [1]In order to exclude outliers, the maximum indicated is the second-highest value in each case.

loss of revenue of 10% will be allowed.[23] Final convergence will then have to take place after 2009.

6.2 Basel II and Rating

Banks have to make reasonable provision for the risk of credit default in order to limit their own risk of insolvency. This provision is made in the form of equity coverage for loans extended. On account of the increasingly complex finance system and in response to some spectacular bank failures, special supervisory rules have been put in place for credit institutions. The Basel Committee on Banking Supervision works to promote the convergence of these rules. This international Committee brings together risk management

[23] On the basis of our calculations, slightly more than 10% of hospitals will be affected by capping. However, capping will not lead to any increase in the funds made available to the system. It will only mean that hospitals which are not affected will lose more revenue or receive a lower level of funding.

experts from the fields of science, economics and politics. It is based with the Bank for International Settlements in Basel and sets out the rules on the equity coverage of credit institutions.

In 1988 the Committee presented its first framework of rules on the international convergence of minimum capital requirements for securing credit risks. It came to be known by the name Basel I and as a rule required an equity coverage of 8% for loans to corporate entities. This safety net applied independent of whether the borrower represented a high or low individual risk of default. As a result this did not adequately reflect a bank's true risk profile.

To address this situation and to stabilise the international financial markets, the Basel Committee developed a new framework (Basel II) in which the equity coverage for loans is linked to the borrower's individual risk of default (BIS 2003, 2004). In the insurance industry, for example, the amount of premiums is nowadays always calculated on the basis of the insured entity's individual risk. In 2007 Basel II will replace the first framework. The move from a mean-oriented calculation towards terms reflecting the actual risk of credit is being accelerated by Basel II but did not start with it. Already in the past, efforts to adopt more effective rating and pricing models to determine individual interest margins for loans were driven by the weak earnings position of German credit institutions on an international comparison, mounting competition, advances in capital markets theory as well as the availability of modern information and communication technologies.

Depending on the degree of default risk and the collateral furnished by the borrower, the risk margin for coverage of the default risk is determined. This risk margin has two components: firstly, the bank must make provision for those credit losses it expects as the statistical mean loss when it extends the loan. Hence, it can be assumed that with a probability of default of 1% per year the default will average 1% of the loan amount per annum and will have to be covered by provisions. However, since this value is only a statistical mean, the actual losses may be higher or lower. Basel II requires banks to make adequate capital provision for unexpected high losses. It is calculated by means of a complex process which is set out in the Basel framework. The equity capital provided as coverage cannot be used in a bank's actual banking operations, resulting in opportunity costs. These are included in the risk premium as the second component. For borrowers with a low risk this means that they will obtain cheaper financing in future, whereas borrowers with a high risk will have to face rising costs or even the possibility of not being extended any more loans.

Under Basel II, a bank is required from 2007 to assess the credit standing of a borrower by means of an internal rating. A rating is a means of classifying companies based on their probability of default. Each rating class represents a

certain range of probabilities of default. The rating takes account of a company's material risk factors and weights these according to their explanation power for the company's aggregate risk. Statistical methods are applied to identify as well as weight the risk factors. For this purpose a data set of past annual financial statements is set up in such a way that it contains a sufficient number of insolvent and solvent borrowers. It is only in this way that the relevance of presumed risk factors or determinants for explaining the development of a credit default can be filtered out using statistical methods. Ratings that do not apply the methods described above are based on qualitative expert estimates and are generally inferior to approaches based on statistical methods. The quality of a rating model is measured by its forecasting power. The better it is at forecasting company failures, the more valid it is. This can be determined ex post using a validation data set.

6.3 Rating Procedure of this Study

In order to develop a hospital-specific rating system, it would be necessary to have a database including a large number of insolvent and non-insolvent hospitals. However, hospitals have rarely become insolvent in the past as financial problems were normally eliminated by the operating body. Frequently, local authorities absorbed the losses of a hospital. Even if there had been some insolvent hospitals, the number would have been too low to develop a hospital rating system based on statistical techniques; as the total number of hospitals is only about 2,000, the absolute number of insolvent institutions would have been very low indeed.

In order to allow the application of tried and tested methodology, it was decided to use the *Moody's RiskCalc* balance sheet rating system, which was developed using a database with 11,400 German financial statements of more than 4,400 companies (Moody's 2001: 4) and has proved, in a number of tests conducted by leading German banks, to be just as reliable as internal procedures developed by banks. According to information supplied by Moody's, its national *RiskCalc rating systems* are used by about 200 financial service providers throughout the world. Moody's RiskCalc calculates the probability of default of a company on the basis of its latest financial statements and the change in revenue compared with the previous year. Nine indicators from six different areas are used in Moody's RiskCalc (Figure 66). The areas of *Profitability and Indebtedness* have the greatest effect on the rating. In general, the results of financial statement analysis are the key element in internal bank rating systems, often with a weighting of 60% to 75%. Qualitative factors such as management quality, the quality of bank details and the business environment are typically considered by a separate rating and form the second pillar of internal bank rating systems.

Figure 66

Nine key values determine the RiskCalc rating

Area	Weighting in %	Value	Definition	Assessment
Capital tie-up	10	Duration of capital tie-up	(Notes payable[1] + trade liabilities)*360/sales	lower is better
Indebtedness	38	Capital structure	(Trade liabilities + notes payable[1] + bank liabilities)/(liabilities + provisions - advances)	lower is better
		Net indebtedness	(Current liabilities - cash and equivalents)/ total assets	lower is better
		Equity ratio (adjusted)	(Equity - intangible assets)/(total assets – intangible assets – cash and equivalents – land and buildings)	higher is better
Debt coverage	9	Debt coverage	Cash flow / (liabilities + provisions - advances)	higher is better
Profitability	25	EBITD-ROI	(Net profit + interest expenses + income taxes + depreciation)/total assets	higher is better
		Return on sales	Operating profit/sales	higher is better
Productivity	11	Staff costs ratio	Staff costs/sales	lower is better
Growth	7	Sales growth	Sales/sales of previous year	moderate is good[2]

After Moody's (2001). – [1]Liabilities in connection with notes. – [2]Up to sales growth of 25%, "higher is better"; above 25%, the converse applies.

The basic idea and the central feature of the ADMED/RWI rating is its future orientation. On the basis of actual financial statements in the past, pro forma balance sheets and income statements for the years from 2005 to 2009 are drawn up taking into consideration hospital-specific factors and then subjected to rating. The results are projected ratings up to 2010.

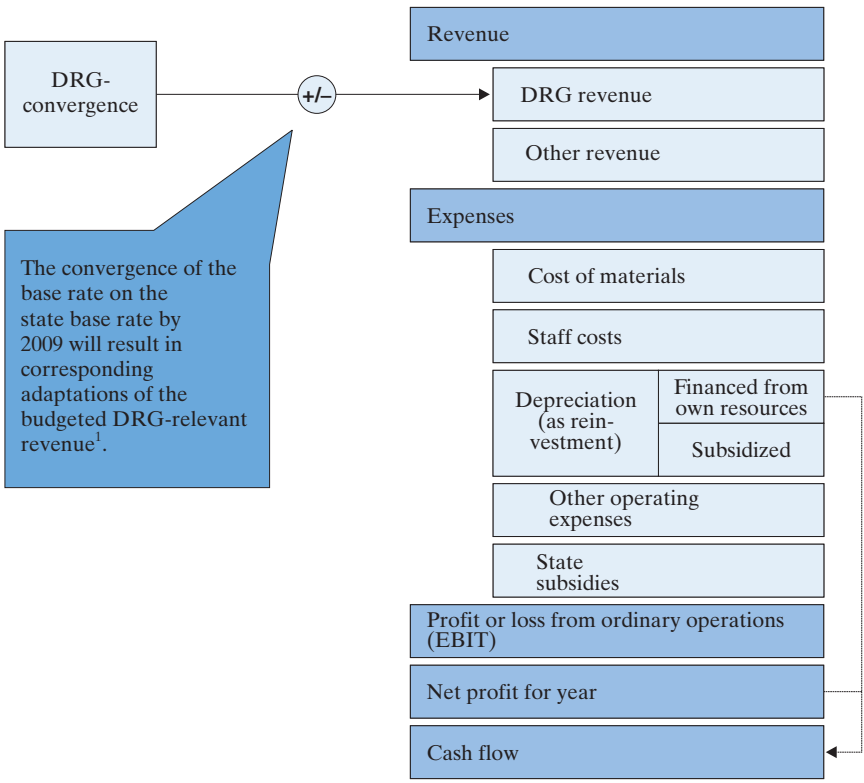
6.4 Assumptions for Scenarios

In total, five hospital-specific factors are taken into consideration.

1. DRG convergence up to 2009;
2. Demand for hospital services at the district level (on the basis of demographic developments);
3. Fall in state subsidies to finance investments;
4. Increased tapping of outpatient potential;
5. Staff costs.

Staff cost rises above budget growth of 0.5% per year in real terms can easily be integrated in the modelling calculations. We therefore pay no further attention to this scenario. DRG convergence is the key factor, based on the requirements of the Fallpauschalengesetz (DRG Flat Rate Act). Up to 2009, the DRG-relevant revenue of a hospital will be proportional to its DRG base rate. An increase in base rate will lead to growth in revenue, while a fall will lead to lower revenue from the same services (Figure 67). Additional fees are

Figure 67
DRG convergence influences DRG revenue



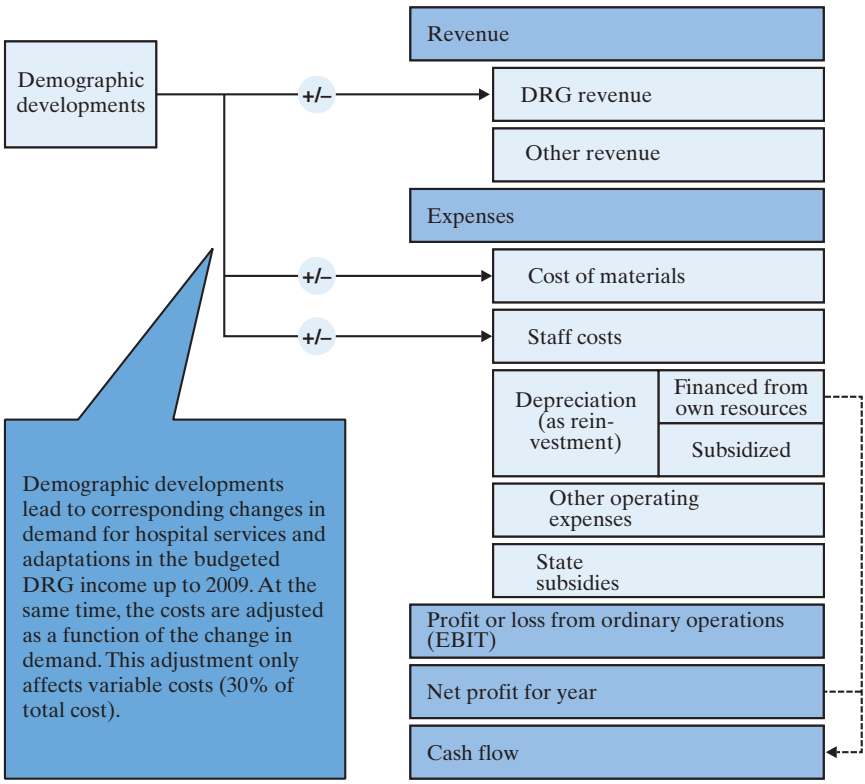
Analysis by ADMED and RWI Essen. – [1]Reactions by hospitals have not been taken into consideration. The objective of this analysis is to consider the effect of DRG convergence in isolation. We assume that 80% of hospital revenue is DRG-relevant.

not taken into consideration. We assume that 80% of hospital revenue is DRG-relevant. In addition, we assume that hospitals will react passively to DRG convergence and, particularly, that hospitals with a high base rate will not take any action to reduce costs. The objective of this analysis is only to indicate the effects of DRG convergence viewed in isolation, not the effects of counter-measures.

Local demographic developments will have a considerable effect on local demand for health services in general and hospital services in particular. We model the expected local demand for hospital services up to 2010 at the district level. For this purpose, we use population projections for the 440 districts in Germany (Bundesamt für Bauwesen und Raumordnung 2004) and assume

Figure 68

Demographic developments influence DRG revenue



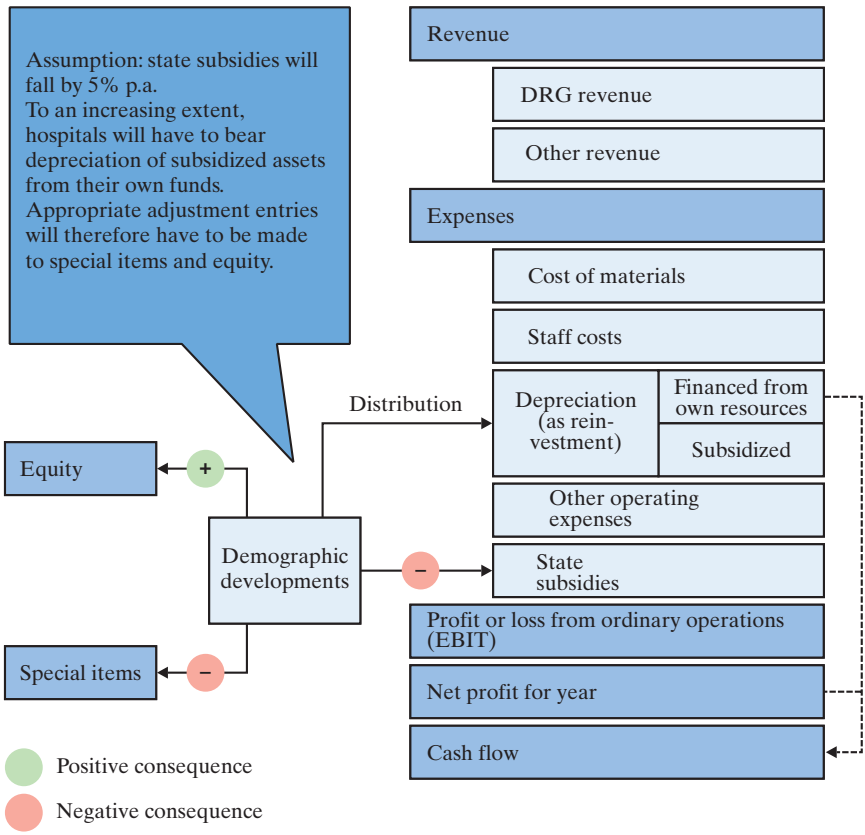
Analysis by ADMED and RWI Essen.

that the demand for hospital services in each age group will remain unchanged up to 2010. Hospital services are differentiated by department, allowing the department structure of each hospital in the database to be considered (Statistisches Bundesamt 2005b). For example, demographic developments will lead to a severe fall in case numbers of all treatments connected with childbirth and children and to an increase in case numbers of illnesses connected with old age. Using these mechanisms, the future demand for the services of each hospital is predicted. In general terms, demand is expected to rise as the ageing of the population will more than offset the fall in population in Germany as a whole.

Hospitals in a district with growing demand will treat more patients and therefore face higher costs. The slight increase in demand up to 2010 can certainly be absorbed through higher capacity utilization. We therefore assume

Figure 69

Fall in state subsidies calls for greater contributions from hospitals' own funds



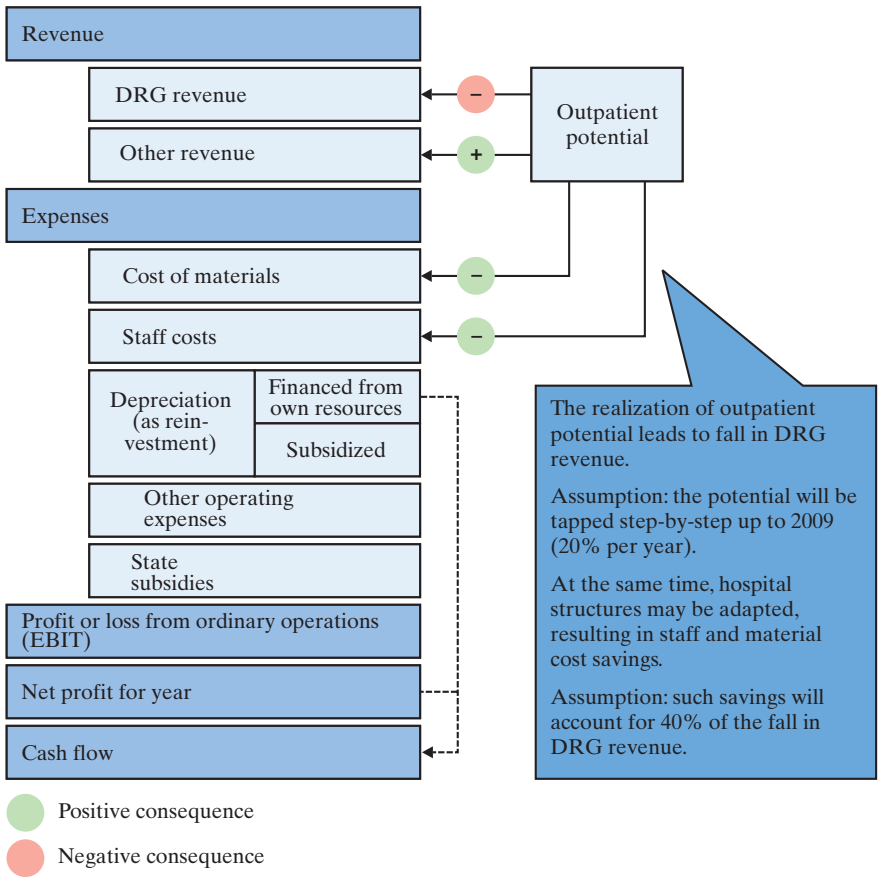
Analysis by ADMED and RWI Essen.

that variable costs, which account for about 30% of total cost, will increase. The extent to which revenue will also rise will depend on the magnitude of growth in demand. As the total budget of all hospitals will be capped at least until 2009, it will only be possible to redistribute revenue between hospitals. Hospitals in districts and with departments where the growth in demand is above average, can expect higher revenue. The other hospitals will have to accept falls in revenue (Figure 68). As there is no cap on costs, the average rating will, however, deteriorate in this scenario.

We assume that state subsidies under the Krankenhausfinanzierungsgesetz (Hospital Financing Act) will fall by 5% per annum in real terms, a figure corresponding to the average for the past few years. The result will be that sub-

Figure 70

Realization of outpatient potential reduces revenue and calls for structural change



Analysis by ADMED and RWI Essen.

sidies will cover only 95% and not 100% of the depreciation on subsidized investments. In order to maintain the value of their fixed assets, hospitals will therefore need to dedicate more of their own funds, e.g. cash flow, to investments or possibly to take up loans (Figure 69). In this study, we have only considered an increase in financing from hospitals' own funds. Over the course of the years, the special items will therefore be reduced and the amount of equity capital increased. However, this will be a very slow process.

An increase in outpatient surgery will lead to a reduction in inpatient and an increase in outpatient revenue. However, the rise in outpatient revenue will be insufficient to compensate for the fall in inpatient revenue. We therefore

assume a fall of 4% in overall revenue in the moderate scenario with 5% outpatient potential and 6% in the scenario with higher outpatient potential of 7.5%. The fall in revenue will take place in equal steps over the five years up to 2010. We also assume that hospitals will be able to reduce their costs by 40% of the fall in revenue by adapting their organizational structures and procedures (Figure 70).

7. Glossar

Agglomeration	Area with major cities and a high population density, e.g., in Germany, the Rhine-Main and Rhine-Ruhr regions.
DRG base rate	Amount in euros to be multiplied by the relative weighting of each DRG in order to determine the payment to a hospital for each DRG. The rates for 2004 are based on the negotiated budget of each hospital divided by its case mix. The base rate may be seen as the average price of a hospital. In each federal state, the base rates charged by the various hospitals will converge by 2009.
Basel II	New guidelines for the equity capital to be held by banks. The objective of the new guidelines, which come into force in 2007, is to ensure that the capital held is based on the actual risk profile of the bank.
Case mix	The sum of the relative weightings of all the DRGs treated at a hospital.
Cash flow	The funds actually available to an enterprise. In this study, cash flow is calculated as net profit for the year plus depreciation on investments financed by the hospital itself.
Convergence phase	Step-by-step convergence of the individually negotiated base rates for 2004 on a standard rate for each state. The convergence phase is due to end in 2009.
Creditworthiness	The ability of a debtor to meet its payment obligations.
Diagnostic related group (DRG)	Groups of cases requiring similar treatment to which each case is assigned as a function of the diagnoses and the procedures to be carried out. Each DRG has a relative weighting which is the same for every hospital in Germany.
Fallpauschalengesetz (DRG Flat Rate Act)	The German law "*Gesetz zur Einführung des Diagnoseorientierten Fallpauschalensystems für Krankenhäuser*" (Act Concerning the Introduction of a Diagnosis-Oriented Flat Rate System for Hospitals) enacted in April 2002. This new law resulted in amendments to the Sozialgesetzbuch V (Social Code, Part V), the Krankenhausfinanzierungsgesetz (Hospital Financing Act) and the Bundespflegesatzverordnung (Statutory Instrument Concerning Hospital Daily Rates). It also includes the *Gesetz über die Entgelte für voll- und teilstationäre Krankenhausleistungen* (KHEntG – Act Concerning Fees for Services Provided to Inpatients and Partial Inpatients at Hospitals). Since it was introduced, the Act has been amended by the *Fallpauschalenänderungsgesetz* (FPÄndG – DRG Flat Rate Amendment Act). A bill proposing further amendments is currently in the legislative process.
Income statement	A list of the income and expenditure items of a company for a defined period, normally one year.
Probability of default	Probability that a company will default on its credit obligations. The probability, usually, refers to a one-year period.
Rating	Rating classes are defined for assessing the creditworthiness of a debtor. In the case of internal rating by banks, internal bank criteria are used. With international rating agencies such as Moody's, Standard & Poor's, Fitch, rating follows a comprehensive review of the company.
Regression analysis	Technique for adapting the parameters of a function $y = f(x)$ so that the deviation between the observed values of y and those predicted by the function is minimized. Bivariate: $f(x)$ has only one explanatory variable Multivariate: $f(x)$ has several explanatory variables.
Relative weighting	Weighting of a DRG in accordance with the DRG flat rate payment system. The amount payable to a hospital for a DRG is determined by multiplying the relative weighting by the base rate.

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