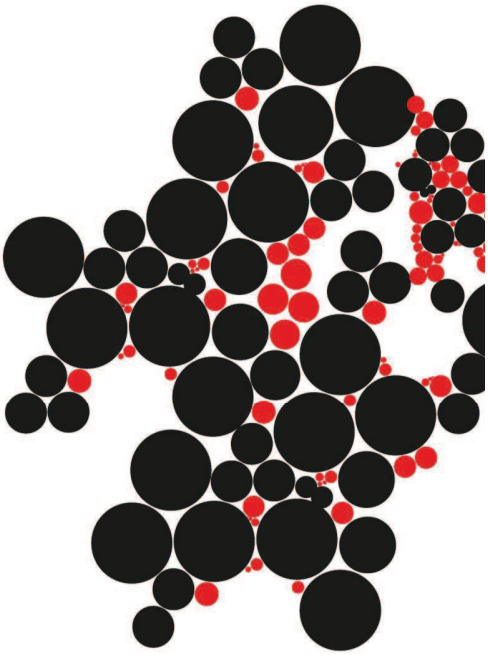
MASTER THESIS



A FINANCIAL HEALTH TEST FOR DUTCH HOSPITALS

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MANAGEMENT AND GOVERNANCE
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Voorwoord

Voor u ligt het afstudeeronderzoek ter afronding van mijn studie Business Administration aan de Universiteit Twente. Gelijktijdig met dit afstudeeronderzoek heb ik ook gewerkt aan het afstudeeronderzoek van de opleiding Civil Engineering & Management. Deze heb ik in december 2010 afgerond, waardoor nu daadwerkelijk een einde komt aan mijn studententijd. Het vrijwel gelijktijdig uitvoeren van twee afstudeeronderzoeken maakte het een intensieve afstudeerperiode. Al ben ik blij met de eindresultaten en kijk ik met een goed gevoel terug op deze leerzame periode.

Mijn interesse in de zorgsector is ontstaan door de transitie die in de zorgsector gaande is van volledige regulering naar gereguleerde marktwerking. Met als gevolg een toename van financiële risico's voor individuele ziekenhuizen. De consequenties hiervan op de financiële positie van ziekenhuizen en financierbaarheid van nieuwbouwprojecten spraken mij in het bijzonder aan. Middels dit afstudeeronderzoek hoop ik hierover meer kennis en inzicht te hebben geven. Immers, het resultaat van dit afstudeeronderzoek is een framework waarmee een ziekenhuisbestuurder en zijn adviseur de kredietwaardigheid van een individueel ziekenhuis kan beoordelen.

Mijn dank gaat uit naar mijn begeleider van de Universiteit Twente, Henk Kroon voor de kennis die ik heb opgedaan van de theoretische en praktische mogelijkheden van financiële ratio's. Daarnaast wil ik ook mijn begeleider van de Twynstra Gudde, Gertjan te Hoonte bedanken voor de gegeven feedback en het geven van de inzichten in bouwprocessen binnen de zorgsector. Ook wil ik alle geïnterviewden bedanken voor de tijd die ze voor mij hebben vrijgemaakt en voor de praktische informatie die ik dankzij hen heb gekregen.

Afsluitend wil ik mijn ouders bedanken voor de mogelijkheden en steun die ze mij hebben geven om verder te studeren. Monique, ook jou wil ik bedanken voor het behouden van de motivatie tijdens mijn afstudeerperiode!

Robert Hogerwerf

Utrecht, April 2011

Samenvatting

Aanleiding
Het afschaffen van het bouwregime heeft ervoor gezorgd dat ziekenhuizen zelf de verantwoordelijkheden en risico's dragen voor vastgoedinvesteringen. Daar waar ziekenhuizen in het verleden op basis van een vergunning van het Bouwcollege een vergoeding kregen voor het genormeerde gebouwoppervlak, die onafhankelijk was van de bezetting van het ziekenhuis, dienen nu de kapitaallasten terugverdiend te worden uit de omzet van het ziekenhuis. Voorheen was de financiering van vastgoedinvesteringen het sluitstuk van het proces en geschiedde hoofdzakelijk door banken met vreemd vermogen. Momenteel is dat niet meer zo en maken de gevolgen van de kredietcrisis het er voor een ziekenhuis niet makkelijker op. Het gevolg is dat de financiering van vastgoedinvesteringen onder druk is komen te staan. In dit onderzoek is de kredietwaardigheid van algemene ziekenhuizen geanalyseerd door middel van financiële ratio's.

Onderzoeksopzet
De doelstelling van dit onderzoek is het ontwikkelen van een framework voor ziekenhuismanagers en hun adviseurs dat een indicatie geeft van de kredietwaardigheid van een individueel ziekenhuis. De literatuurstudie heeft inzicht gegeven in financiële ratio's en modellen om de financiële positie van individuele ziekenhuizen te beoordelen. Door middel van interviews met banken en het Waarborgfonds voor de Zorgsector (WfZ) zijn de aspecten achterhaald waar ziekenhuizen rekening mee dienen te houden bij een financieringsaanvraag.
In het praktijkdeel van dit onderzoek worden de financiële prestaties van ziekenhuizen in 2007 en 2008 geanalyseerd met behulp van relevante financiële ratio's. De data set is verkregen van het Centraal Informatiepunt Beroepen Gezondheidszorg (CIBG) en bevat 82 algemene ziekenhuizen (96 procent van alle Nederlandse ziekenhuizen). Eenzijdige ANOVA (Analysis Of Variance) is toegepast om te onderzoeken of er significante verschillen zijn in financiële ratio's tussen verschillende groepen ziekenhuizen. Tot slot is een framework ontwikkeld dat ziekenhuismanagers en hun adviseurs een indicatie geeft van de kredietwaardigheid van een individueel ziekenhuis.

Financiële ratio-analyse
Financiële ratio-analyse is "een geaccepteerde manier om de prestaties van ziekenhuizen te evalueren" (Zeller, Stanko and Cleverly, 1996)". Door middel van de literatuurstudie zijn zes categorieën financiële ratio's geïdentificeerd: liquiditeit ratio's, solvabiliteit ratio's, winstgevendheid ratio's, kasstroom ratio's, activiteiten ratio's en overige ratio's. Totaal zijn 66 ratio's geselecteerd om de financiële positie van ziekenhuizen te analyseren. Voor Nederlandse ziekenhuizen zijn over 2007 en 2008 berekend: het gemiddelde, de mediaan, de standaarddeviatie, het minimum en het maximum van deze 66 ratio's.

Financiële eisen door banken en het WfZ
Een belangrijke eis die aan ziekenhuizen gesteld wordt door banken en het WfZ is dat er een 'realistisch 'en 'haalbaar' businessplan is. Het businessplan vormt een cruciaal onderdeel in het verkrijgen van de financiering en de garantie. Dit onderzoek richt zich voornamelijk op het financiële deel van het businessplan met behulp van financiële ratio's. Onderdelen van het financiële businessplan zijn de meerjarige financiële ramingen van de balans, de winst- en verliesrekening en het kasstroomoverzicht. Door middel van scenarioanalyses dient geanalyseerd te worden wat de gevolgen zijn van variaties in de uitgangspunten om zodoende te toetsen of de operationele kasstroom van voldoende omvang is om rente en aflossing aan de financiers te kunnen betalen. Het is van belang om onzekerheden op zowel overheidsbeleid als zorgvraag gebied mee te nemen.
Op basis van interviews met banken en het WfZ zijn belangrijke aspecten ontdekt waar het ziekenhuismanagement en hun adviseurs rekening mee dienen te houden bij het opstellen van het businessplan:

- **Afschrijvingstermijnen en rentemarges:** In de meerjarige ramingen dienen ziekenhuizen rekening te houden met kortere afschrijvingstermijnen en dus een kortere aflossingsperiode en hogere jaarlijkse aflossingen. Tevens dienen hogere rentemarges in acht te worden genomen vanwege de toename van risico's voor banken. Rentedifferentiatie kan ontstaan tussen individuele ziekenhuizen. Ook de eisen die door Basel III gesteld worden aan banken kunnen gevolgen hebben voor de financiering en de rente die ziekenhuizen betalen. Tot slot is het ook mogelijk dat banken niet meer voor honderd procent van de financiering zorgen, met als gevolg dat ziekenhuismanagers voor alternatieve financiering dienen te zorgen.
- **Rentenormering:** Het afschaffen van de rentenormering leidt ertoe dat ziekenhuizen renterisico's dienen te beheersen om de gevolgen voor het businessplan te minimaliseren. Rentederivaten zijn hiervoor een mogelijkheid. Een toetst die door het WfZ gebruikt wordt is dat maximaal vijftien à twintig procent van de leningen open mag staan aan renteherziening of herfinanciering.
- **WfZ en Go Cure:** Door een WfZ-garantie en de Garantie Ondernemingsfinanciering Curatieve Zorg (Go Cure) kunnen ziekenhuizen een rentevoordeel op de lening ontvangen. De Go Cure regeling is beschikbaar voor investeringen tot vijftig miljoen euro en garandeert vijftig procent van een nieuwe banklening. De WfZ-garantie is er in principe ook voor grotere investeringen echter het is voorstelbaar dat het WfZ bij grote financieringen geen garantie meer geeft voor de gehele financiering.
- **Periode:** Het businessplan dient vooral de financierbaarheid van het project aan te tonen in de eerste 5 tot 10 jaar na de investering. Dit is vaak de meest kritieke periode vanwege de zogenoemde 'badkuip' (uitgaven die groter zijn dan de inkomsten) na de investering.
- **Minimale waarden:** Het is momenteel gebruikelijk om voor financiële ratio's minimale waarden in de kredietovereenkomst vast te leggen (bijvoorbeeld voor: de debt service coverage ratio, de eigenvermogensgraad en het weerstandsvermogen). Zodoende kan een bank ingrijpen op het moment dat een ziekenhuis niet voldoet aan de gestelde minimale waarden.
- **Consortium:** Bij investeringen boven de 125 tot 150 miljoen euro geven banken de voorkeur aan het verstrekken van de financiering met meerdere banken in een consortium.
- **Hypothecaire zekerheden:** Ter zekerheidstelling geven banken en het WfZ aan dat het tegenwoordig bij het verstrekken van een lening of garantie een standaard is geworden om op de activa een hypothecaire inschrijvingen te vestigen. Ondanks dat de alternatieve aanwendbaarheid van ziekenhuisgebouwen vaak beperkt is. Maar het geeft bij een faillisement banken en het WfZ een sterkere positie ten opzichte van andere schuldeisers.

Data-analyse financiële positie ziekenhuizen

Uit de resultaten van de in dit onderzoek uitgevoerde ratio analyse is gebleken dat in het algemeen ziekenhuizen betere financiële prestaties laten zien in 2008 dan in 2007 het geval was. Echter er zijn sterke variaties tussen ziekenhuizen onderling.

- **Liquiditeit:** Bij de meeste ziekenhuizen zijn de vlottende activa groter dan de vlottende passiva. De lage liquiditeit wordt voornamelijk veroorzaakt door de late sluiting van DBC's (Diagnose Behandel Combinaties) en late betalingen. De terugbetalingen aan zorgverzekeraars kunnen consequenties hebben voor ziekenhuizen. In totaal dienen ziekenhuizen circa twee miljard euro terug te betalen aan zorgverzekeraars. In het licht hiervan geven banken aan dat zij terughoudend zijn geworden met het financieren van werkkapitaal.
- **Solvabiliteit:** De eigenvermogensgraad is in 2008 met 3,42 procent toegenomen tot 10,55 procent. Hoofdzakelijk vanwege veranderingen in de accountingregels door het toevoegen van de egalisatierekening aan het eigen vermogen. De mogelijke impairment verliezen kunnen een aanzienlijke impact hebben op het eigen vermogen van ziekenhuizen omdat de verliezen direct als verlies afgeschreven dienen te worden. Sommige ziekenhuizen hebben dit ook gedaan. De betreffende ziekenhuizen hebben hiertegenover eenzelfde bedrag aan vorderingen opgenomen tegen het ministerie van VWS. In de praktijk is gebleken dat deze vorderingen maar deels inbaar zijn.

- **Winstgevendheid:** De nettowinstmarge was in 2008 met gemiddeld 1,00 procent laag. De ziekenhuizen hebben vergeleken met 2007 hun winstgevendheid licht verbeterd. Echter het netto bedrijfsresultaat wordt voor een groot deel beïnvloed door bijzondere baten en lasten. Door toekomstige overheidskortingen kunnen de marges verder onder druk komen te staan.
- **Kasstroom:** De investeringskasstroom is bij de meeste ziekenhuizen groter dan de operationele kasstroom. De investeringen zijn gefinancierd met kortlopende schulden en met het eigen vermogen en tevens met nieuw aangetrokken langlopende leningen.
- **Activiteiten: Z**iekenhuizen behoren tot een kapitaalintensieve industrie en hebben dus grote investeringen nodig om opbrengsten te genereren. Tevens blijkt dat de de economische staat van de ziekenhuisgebouwen sterk varieert.
- **Overige:** De opbrengsten in het B-segment zijn toegenomen tot gemiddeld achttien procent. Dit wordt voornamelijk veroorzaakt door de uitbreiding van het B-segment (sinds 1 januari 2008) en het meetellen van de kapitaalskostencomponent in het B-segment.

ANOVA

Hypothesen zijn getoetst om te onderzoeken of er significante verschillen zijn in liquiditeit ratio's, solvabiliteit ratio's en winstgevendheid ratio's tussen ziekenhuizen. De resultaten geven aan dat er geen significante verschillen zijn in financiële ratio's bij variaties in type ziekenhuizen (top-klinisch en algemeen), variaties in locatie (Randstad of buiten de Randstad) en variaties in opbrengsten (groot, middel en klein). Maar ziekenhuizen met verpleging, verzorging en thuiszorg activiteiten laten een significant lagere current ratio en brutowinstmarge zien dan de overige ziekenhuizen. De lagere current ratio is voornamelijk vanwege de late facturing en incassering van de DBC's. Gebleken is dat de opbrengsten uit het B-segment ten opichte van de totale opbrengsten significant groter zijn bij topklinische ziekenhuizen dan bij algemene ziekenhuizen. Ziekenhuizen met verpleging, verzorging en thuiszorg activiteiten halen een significant kleiner deel van hun opbrengsten uit het B-segment dan de overige ziekenhuizen. Het B-segment ten opzichte van de totale opbrengsten is ook bij kleine ziekenhuizen groter dan bij middel en grote ziekenhuizen. Andere significante verschillen tussen deze twee groepen zijn er niet ontdekt.

Financiële Gezondheid Test

In dit onderzoek is een Financiële Gezondheid Test ontwikkeld om de kredietwaardigheid van ziekenhuizen te beoordelen. In tabel 1 (zie volgende pagina) is de Financiële Gezondheid Test met de daarbij behorende minimale kredietwaardigheidsnormen te zien. De Financiële Gezondheid Test is de eerste stap in het beoordelen van de kredietwaardigheid van een individueel ziekenhuis. De uiteindelijke kredietverstrekking is afhankelijk van de beoordeling van zowel de kwantitatieve als de kwalitatieve analyse. Onderdelen van de kwalitatieve analyse zijn: kwaliteit van het bestuur en management, relatie met zorgverzekeraars, omgevingsaspecten, risicomanagement- en controlsystemen etc.

Tabel 1 De Financiële Gezondheid Test.

Financiele ratio's	**Minimale waarde**
A. Kritieke ratio's	
Winstgevendheid	
R1: Nettowinstmarge	meer dan 1,0 procent
R2: Rendement op investering	meer dan 5,0 procent
Solvabiliteit	
R3: Eigenvermogensgraad	meer dan 15,0 procent
R4: Debt service coverage ratio	meer dan 1,2
B. Minder kritieke ratio's	
Liquiditeit	
R5: Kasmiddelen dagen	meer dan 5 dagen
R6: Debiteurendagen	minder dan 90 dagen
Activiteiten	
R7: Continuiteitsratio materiële vaste activa	meer dan 1,0

Resultaten

De kredietwaardigheid van Nederlandse ziekenhuizen is onderzocht met behulp van de Financiële Gezondheid Test. Deze test bestaat uit zeven financiële ratio's met daarbij behorende minimale normen die een ziekenhuis dient te behalen. Onderzocht is of ziekenhuizen in 2007 en 2008 onder of boven de normen presteren, zoals die in de test en tabel 1 zijn weergeven. De resultaten geven een indicatie van de kredietwaardigheid van de ziekenhuizen.

Uit de test blijkt dat de meeste ziekenhuizen maar aan één à twee van de vier 'kritieke ratio's' voldoen. Vooral de gestelde normen voor rendement op investering en eigenvermogensgraad worden niet gehaald door de meeste ziekenhuizen. Aangezien bij slechts 55 procent van de ziekenhuizen de nettowinstmarge groter is dan één procent zal het zonder veranderingen jaren duren voor de eigenvermogensgraad van ziekenhuizen boven de norm van vijftien procent uitkomt.

Ten aanzien van de 'minder kritieke ratio's' voldoet een meerderheid van de ziekenhuizen wel aan de drie normen op het gebied van kasmiddelendagen, debiteurendagen en continuiteitsratio van de materiële vaste activa. Echter verbeteringen van de financiële ratio's zijn absoluut noodzakelijk. Zeker aangezien investeringen het resultaat onder druk zetten en in principe de balans verlengen en daarmee de financiële ratio's doen verslechteren. Mogelijke overheidskortingen op het ziekenhuisbudget zullen ook de financiële positie van ziekenhuizen verder onder druk zetten. Daarbij zal het in de toekomst moeilijker worden om aan de ratio's te voldoen door de strengere eisen die banken en het WfZ stellen.

De resultaten van de Financiële Gezondheid Test geven aan dat de meeste ziekenhuizen moeite zullen hebben om hun nieuwbouwplannen gefinancierd te krijgen. Met als gevolg dat het voor ziekenhuizen moeilijk is om investeringen te doen om de staat van de ziekenhuisinfrastructuur op peil te houden. Voor de meeste ziekenhuizen is een verbeteringen van de financiële positie dus noodzaakzakelijk.

Aanbevelingen

Ziekenhuizen dienen hun financiële positie te verbeteren, in het bijzonder de eigenvermogensgraad, het rendement op investering en de nettowinstmarge. Verbeteringen zijn noodzakelijk om financiering aan te trekken voor investeringen in materiële vaste activa (o.a. ziekenhuisgebouwen).

De Financiële Gezondheid Test kan door ziekenhuismanagers en hun adviseurs toegepast worden bij het bepalen van de kredietwaardigheid van het ziekenhuis. De Financiële Gezondheid Test, ontwikkeld om de kredietwaardigheid van ziekenhuizen te beoordelen, geeft ook ziekenhuismanagers en hun adviseurs de

mogelijkheid om financiële moeilijkheden te voorkomen door een 'early warning system'. De financiële eisen die door banken en het WfZ aan ziekenhuizen gesteld worden en in dit onderzoek gevonden zijn, horen door ziekenhuismanagers en hun adviseurs meegenomen te worden in het businessplan. Daarnaast verdienen ziekenhuismanagers de aanbeveling om zich meer te verdiepen in de financiële ratio's aangezien financiële ratio's maar beperkt worden toegepast in de jaarverslagen van ziekenhuizen.

Vervolgonderzoek zou zich op een aantal aspecten kunnen richten. Ten eerste zou nader onderzoek gedaan kunnen worden naar modellen om de insolventie van Nederlandse ziekenhuizen te voorspellen. Aanvullend onderzoek kan zich ook richten op niet-financiële factoren en het ontwikkelen van de daarbij behorende kredietwaardigheidsnormen. Toekomstig onderzoek zou ook kunnen toetsen of niet-financiële factoren de financiële positie van ziekenhuizen beïnvloeden. Het verdient tevens de aanbeveling om toekomstig onderzoek te doen naar het bepalen van gewichten (mate van belangrijkheid) van de verschillende financiële ratio's. Om zodoende een nauwkeuriger model te ontwikkelen om de financiële situatie van een individueel ziekenhuizen te bepalen. Voor het verkrijgen van meer inzicht in de financiële situatie van ziekenhuizen zou het goed zijn om dit onderzoek in te toekomst te herhalen. In dit onderzoek zijn 66 financiële ratio's onderzocht. In vervolgonderzoek kan een factoranalyse uitgevoerd worden om het aantal financiële ratio's te reduceren.

Summary

Introduction

Currently, the abolition of the building and construction regime (in Dutch: Bouwregime) has ensured that hospitals bear the responsibilities and risks for real estate investments themselves. In the past, hospitals received a fee for the standardised building area on the basis of a license from the Dutch Board for Hospital Facilities (in Dutch: College Bouw Zorginstellingen, CBZ), independent of the occupation of the hospital. Nowadays, hospitals need to recover the costs of capital from the production of the hospital. Formally, the financing of real estate investments was the end of the process and was undertaken mainly by banks with debt capital. However, at the present this is situation has changed. Also, the consequences of the credit crisis have not made things easier for hospitals. The result is that the financing of real estate investments by hospitals has come under pressure. In this research, I analyse the credit worthiness of general hospitals by means of financial ratios.

Research design

The objective of this research is to develop a framework for hospital managers and their advisors that gives an indication of the credit worthiness of an individual hospital. A literature research gives insight into financial ratios and models to assess the financial position of individual hospitals. Interviews with banks and the Guarantee Fund for the Health Care Sector (in Dutch: Waarborgfonds voor de Zorgsector, WfZ) give insights into important aspects for a credit application.

In the practical part of this research, the financial performance of hospitals in 2008 and 2007 is analysed by means of the relevant financial ratios. The data were obtained from the Central Information Unit on Health (in Dutch: Centraal Informatiepunt Beroepen Gezondheidszorg, CIBG) and they cover 82 general hospitals (96 per cent of all Dutch general hospitals). One Way ANOVA (Analysis of Variance) is used to analyse whether there are significant differences in financial ratios between different groups of hospitals. Finally, a framework is developed for hospital managers and their advisors that gives an indication of the credit worthiness of an individual hospital.

Financial ratio analysis

Financial ratio analysis is "an accepted approach to hospital performance evaluation (Zeller, Stanko and Cleverly, 1996)". A literature review identified six financial ratio categories: liquidity ratios, leverage ratios, profitability ratios, cash flow ratios, activity ratios and other ratios. In total, these categories include sixty-six ratios to analyse the financial performance of hospitals. For Dutch hospitals in 2007 and 2008, the mean, the median, the standard deviation, the minimum and the maximum were calculated using these ratios.

Financial requirements set by banks and WfZ

An important requirement for hospitals set by banks and the WfZ is that there is a 'realistic' and 'feasible' business plan. The business plan is a critical component in obtaining financing and WfZ guarantee. This research focuses on the financial part of the business plan by the use of financial ratios. Parts of the financial business plan are financial forecasts of the balance sheet, profit and loss account and cash flow statement. Scenario analysis should analyse the consequences of variations in assumptions, in order to assess whether the operating cash flow is sufficient to pay interest and principal to the lenders. It is important to take into consideration in the business plan uncertainties in the areas of politics and of health care demand.

The hospital managers and their advisors should consider the following important aspects when drawing up a business plan. These aspects are derived from the results of the interviews with banks and WfZ.

- **Depreciation period and interest margin:** In hospitals long-term estimates should take into account shorter depreciation periods and thus shorter repayment periods and higher annual repayments. Also

higher interest rates must be observed because of the increased risk for banks. Interest differentiation may arise between hospitals because of differences in risk among hospitals. Moreover, the requirements set by Basel III for banks may affect the financing and the interest margins that hospitals pay. Finally, it is also possible that banks no longer finance hundred per cent. As a result, hospital managers should ensure alternative funding.

- **Interest standards:** The abolition of interest standards leads to necessity for hospitals managers to control interest rate risks, in order to minimise the impact on their business plans. Interest rate derivates could be used to control interest rate risks. A test used by the WfZ is that up to fifteen to twenty per cent of the loans can stand open to interest revision or refinancing.
- **WfZ and Go Cure:** Hospitals can get an interest benefit on their loan by the WfZ-guarantee and the Guarantee Business Financing Curative Health Care (in Dutch: Garantie ondernemingsfinanciering curatieve zorg, Go cure). The Go Cure is available for investments up to fifty million euro and guarantees 50 per cent of a new bank loan. WfZ-guarantees can in principle also be given in the case of larger investments. However, it is nowadays conceivable that WfZ don't give a guarantee for the entire funding by large financing.
- **Period:** The business plan must mainly show the eligibility of the project in the first five to ten years after the investment. Frequently, this period is the most critical period because of the so-called 'bath-tub' (expenditures are larger than income) after the investment.
- **Minimal values:** It is currently usual to set minimal values for financial ratios in the credit agreement (for example: debt service coverage ratio and equity financing). So, a bank can intervene when a hospital does not meet the specified minimum values.
- **Consortium:** For investments above 125 to 150 million euro, banks generally prefer to provide financing with several banks in a consortium.
- **Mortgage registration:** Banks and WfZ indicate that, in the case of the granting of a loan, a mortgage registration has become a standard, even though the alternative use of hospital buildings is limited. However, in case of bankruptcy, this gives banks and WfZ a stronger position in comparison with other creditors.

Data analysis hospital's financial position

From the results of the ratio analysis in this research it has become clear that, in general hospitals performed better in 2008 than in 2007. However, there are large variations between hospitals.

- **Liquidity:** At most hospitals the current liabilities exceed the current assets. The low liquidity is mainly due to the late closure of the Diagnosis Treatment Combinations (in Dutch: Diagnose Behandel Combinaties, DBC) and late invoice. The recovery of large repayment obligations to health care insurers has implications for hospitals. In total, hospitals should repay around two billion euro to health care insurers. In a view of this, banks indicate that they are reluctant to provide significant finance for working capital.
- **Leverage:** The equity financing ratio increased in 2008 by 3.42 per cent to 10.55 per cent. This was caused mainly by changes in accounting rules, concerning the addition of the equalisation reserves to the equity capital. The possible impairment losses could have a substantial impact on the equity capital of hospitals, because the loss should be written down directly as a loss on the profit and loss account. A few hospitals have already done so. These hospitals also have included an equal amount of account receivables against the Ministry of VWS. In practice it appears that these account receivables is only partly recoverable.
- **Profitability:** Measured by the total margin at 2008 was approximately 1.00 per cent. The small in total margin compared to 2007 indicates that hospitals have improved their profitability. However, the net profit margin is affected by occasional ex-post reimbursement. Future government discounts may cause further pressure on the margins.

- **Cash flow:** The cash flow from investing activities is greater than the cash flow from operating activities for most hospitals. The investments were financed with short-term debt and equity, but also with new long-term loans.
- **Activities:** Hospitals belong to a capital intensive industry and therefore have to make large investments to generate revenues. It is also evident that the economic state of hospital buildings varies strongly between hospitals.
- **Other:** The B-segment revenue has increased on average to eighteen per cent. This is caused by the expansion of the B-segment since January 1, 2008 and the inclusion of the cost of capital component in the B-segment.

ANOVA

Hypotheses have been tested to investigate if there were significant differences in liquidity ratios, leverage ratios and profitability ratios between hospitals. The results show that there were no significant differences in financial ratios between hospitals among variations in hospital types (top-clinical and general), variations in location (in the Randstad and outside the Randstad) and variations in hospitals revenue (large, middle and small). Only hospitals that provide nursing, care and home care activities show a significant lower current ratio and operating margin than other hospitals. The lower current ratio is primarily due to the late billing and collection of DBCs.
In this research is found that the B-segment revenues as a percentage of the total revenues are significant higher for top-clinical hospitals than for general hospitals. Hospitals that provide nursing, care and home care activities generate a significant lower part of their revenues from the B-segment than the other hospitals. The results show also a significant higher B-segment for small hospitals than by middle and large hospitals. Other significant differences between groups have not been detected.

Financial Health Test

In this research, a Financial Health Test to assess hospitals credit worthiness was developed. Table 1 gives an overview of the Financial Health Test and the used credit worthiness standards. The Financial Health Test is the first step in assessing the credit worthiness of an individual hospital. The final granting of credit depends on the assessment of both quantitative and qualitative analysis. Parts of the qualitative analysis are: quality of board and management, relation with health care insures, environmental aspects, risk management and control systems, and so on.

Table 1 The Financial Health Test.

Financial ratios	**Minimum access criteria**
A. Critical ratios	
Profitability	
R1: Net profit margin	more than 1.0 per cent
R2: Return on investment	more than 5.0 per cent
Leverage	
R3: Equity financing ratio	more than 15 per cent
R4: Debt service coverage ratio	more than 1.2
B. Less critical ratios	
Liquidity	
R5: Days cash on hand	more than 5 days
R6: Days in accounts receivable	less than 90 days
Activity	
R7: Continuation ratio tangible fixed assets	more than 1.0

Results

The test shows that most hospitals meet one or two of the four 'critical ratios' standards. Especially, the return on investment and the equity financing ratio are not obtained by most hospitals. Since only 55 percent of the hospitals have a net profit margin greater than one per cent, without changes, it would take many years until the equity financing ratio is above the fifteen per cent.

Most hospitals reach standards of days cash on hand, days in accounts receivable and continuation ratio tangible fixed assets. However, financial ratio improvements are necessary. In principle, investments extend the balance sheet and thus make worse the financial ratios. The financial position will be also under pressure by possible government discounts on the hospital budget. Therefore, in the future it will be more difficult to achieve the financial ratio standards set by banks and the WfZ.

The results of the Financial Health Test indicate hospitals are facing difficulties to attract new long-term capital. This inhibits the ability of hospitals to invest in their fixed assets, so that they can maintain the state of hospital infrastructure. Therefore, financial performance improvements are necessary for most hospitals.

Recommendations

Hospitals need to improve their financial performance, especially regarding equity financing ratio, return on investment and net profit margin. These improvements are necessary to obtain long-term financing for investments in tangible fixed assets (hospital buildings).

The Financial Health Test can be used by hospital managers and their advisors in the credit worthiness of hospitals. The Financial Health Test developed to analyse hospitals credit worthiness is also a useful test for hospital managers and their advisors and provides them the possibility to avoid financial distress through an early warning system. In this research the financial requirements set by banks and the WfZ are found. The business plan made by hospital managers and their advisors needs to include these aspects. Moreover, it is recommended for hospital managers to look more deeply into financial ratios, since, until now, financial ratios have been applied only in a limited way in the annual hospital reports.

Future research should focus on different aspects. First, future research should investigate models of insolvency prediction in the Dutch hospital context. Second, additional research might also focus on non-financial factors and on developing standards for those factors. Third, future research could also examine whether non-financial factors influence the financial position of hospitals. Fourth, it deserves recommendation to determine the weights (degree of importance) of financial ratios, in order to develop financial performance scores for individual hospitals.

Fifth, this research should be repeated in the future to have more insights into the financial situation of hospitals. Sixth, in this research I analyse sixty-six financial ratios. In a follow-up research, a factor analysis can be carried out to reduce the number of financial ratios.

Contents

1 Introduction

Currently, major changes are occurring in health care. With the introduction of the Health Care Institutions Act (in Dutch: Wet Toelating Zorginstelling, WTZi), health care institutions are responsible for their own real estate. Also, due to this law, there is no longer an obligation for health insurers to enter into contracts with health care institutions. As a result, health care institutions are now responsible for the risks regarding their revenues.
Health insurers now decide for themselves in which health care institutions they will purchase care. They also decide the amount of care and the types of care they will purchase, and at what price. Due to this rivalry occurs among different health care institutions.
Further, the WTZi has introduced the Normative Housing Coefficient (in Dutch: Normatieve Huisvesting Coëfficiënt (NHC)), by which health care institutions are compensated based on a percentage of realized housing instead of by function-specific budgeting (in Dutch: functiegerichte budgettering, FB-budget) as used in the past. Nowadays, the costs of capital are included as a component into the so called Diagnosis Treatment Combination (in Dutch: Diagnose Behandel Combinaties, DBC), the whole of inpatient and outpatient activities. This will stimulate the health care institutions to be more efficient and effective with their real estate, because the health care institutions have to refund the money they spend for housing from their provided health care.
In the new plan, heath care institutions will be increasingly dependent on banks to gain capital for the investment of their property. This research compares the requirements set by financial institutions and the financial performance of Dutch hospitals.

Outline
In chapter 2, the research design is described. The problem and aims, the research questions, the relevance and the research design are discussed. Chapter 3 describes the characteristics of Dutch health care. In chapter 4 a theoretical framework is created and the various ratios are outlined. In chapter 5 the results of the interviews with the banks are explained. Then, in chapter 6, I analyse the financial situation of the Dutch hospitals. This is done using the results obtained from the literature and the interview with the banks. In chapter 7, I describe the in this research developed Financial Health Test and apply this test to Dutch hospitals in 2008 and 2007. Finally, chapter 8 contains the conclusions and chapter 9 the recommendations that can be drawn from this research.

2 Research design

In section 2.1, this chapter discusses the problem formulation. In section 2.2, the research objective is defined. In section 2.3, the research model is presented. In section 2.4, the research questions are given. In section 2.5, the relevance of this research is explained.

2.1 Problem formulation

Since the introduction of the WTZi, the risk profile of a health care institution has changed because health care institutions have to earn enough to repay their investment. This is especially true for the health care institutions that do not get a guarantee for the construction of new buildings from the Guarantee Fund for the Health Care Sector (in Dutch: Waarborgfonds voor de Zorgsector, WfZ) In this case the WfZ does not guarantee the payment of interest and repayment, resulting in increase of financial risks. The increase in financial risks results in a more critical attitude of financiers.
Because of the free market, the Dutch non-profit hospitals will be more and more assessed as for-profit hospitals. This means, for example, that there must be a successful business plan for capital investments. When investing in real estate, financiers will also look at the quality and the reusability of the real estate. Also the past, present and future financial performance of a hospital will be assessed. This is complex since a health care institution has a different purpose than companies, where creating shareholder value or profit maximisation is paramount. The government can set restrictions to health care institutions. It is also possible that hospital activities cannot be undertaken because they do not fit into the goals of the health care institution. Therefore, numbers such as efficiency and profits say a little about the financial health of a health care institution. In this research, I will try to make a framework of financial ratios which can determine the financial health of a health care institution. This gives health care institutions insight into the financial ratios which are important for a bank. The framework could include ratios such as solvency, liquidity and profitability. This leads to the following research question:

Which framework should be developed to assess the financial health of a hospital?

2.2 Research objective

The objective of this research is to develop a framework for hospital managers and their advisors that gives an indication of the credit worthiness of an individual hospital. The framework should provide insights into: financial ratios for hospitals, relevant benchmark data and the financial situation of hospitals.

2.3 Research model

The research model, as shown in figure 2.1 consists of four phases, the initial phase (a), the research phase (b), the analysis phase (c), developing phase (d) and the result phase (e). Preceding these phases, a research proposal has been written.

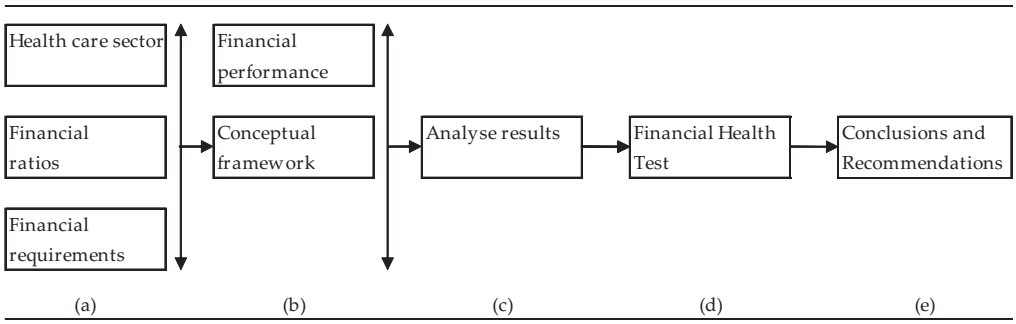

Figure 2.1 The research model.

Explanation research model

(a) The first phase of this research is theoretical and the purpose is laying a theoretical foundation for the continuation of this research. This phase provides an analysis of literature on "financial ratios" and background information concerning the health care sector. Also the practice will be analysed through interviews. These are in-depth interviews with management of care institutions, financiers and regulators. (b) Then, the financial situation of Dutch hospitals is analysed (c). On this basis, a framework (d) is created. This is used to formulate the final framework of ratios. (e) After this conclusions and recommendations are given.

2.4 Research questions

From the research question, central questions have been formulated for each research phase. Ultimately, the central questions will give answers to the research questions.

The research question is:

Which framework should be developed to assess the financial health of a hospital?

The central questions are:

1. What are the developments in the healthcare real estate?
2. What are relevant financial ratios to determine the financial performance of Dutch general hospitals?
3. Which financial ratios are actually used in practice?
4. What is the financial performance of Dutch general hospitals?
5. What are the differences in financial performance between different groups of hospitals?

2.5 Relevance

Scientific relevance

Research on public financial management has been done. However, not on hospitals after they gained access to their real estate. This research will give insights into the financial consequences

Social relevance

Twynstra Gudde advises hospitals on how to deal with their property in a strategic manner. Part of a real estate strategy can be partnerships with market parties. The increasing level of financial risks has made hospitals, lenders and advisors much more interested in financial ratios. The framework investigated in this research will provide Twynstra Gudde insight into the most important financial ratios and relevant benchmark data.

3 Health care sector

First, in section 3.1, this chapter briefly discusses the health care market. In section 3.2 the hospital regulations will be discussed. This chapter gives an answer to research question one: What are the developments in the health care real estate?

3.1 Health care market

The health care market is divided into the cure and care sector. The cure sector consists of general hospitals (AZ), University Medical Centers (UMC), top-clinical hospitals (TZ), family doctors and independent treatment centres (ZBC) and can be described as the treating part of health care. The care sector consists of nursing homes, home care, mental care and handicapped care and can be described as the caring part of health care (RVZ 2001).
This research focuses only on the cure sector and in particular on general hospitals. It is important to distinguish the several types of hospitals because hospitals can have different (educational and research) functions and these function affects the size and complexity of the hospital property. This research focuses only on the cure sector and particularly on the general hospitals; otherwise hospitals are not comparable because of difference in activities. In 2010, the Netherlands had 85 general hospitals which were members of the Dutch Hospitals Association (in Dutch: Nederlandse Vereniging van Ziekenhuizen, NVZ), the national organisation of hospitals.

Figure 3.1 shows that health care costs have increased every year. In 2008, the costs of health care were 79.09 billion euro and 13.3% as a percentage of Gross Domestic Product (GDP). To reduce the increase of health care expenditures the government believes that it is no longer justified to manage the health care costs by the traditional system of budget-financing. On 1 January 2006 a complete revision of the health care system has been carried out. A regulated free-market is a part of this (CBZ 2006: 22). In the following sections the regulated market system will be explained. However, to make clear the changes with respect to the old and new health care systems I will start by describing the old health care system.

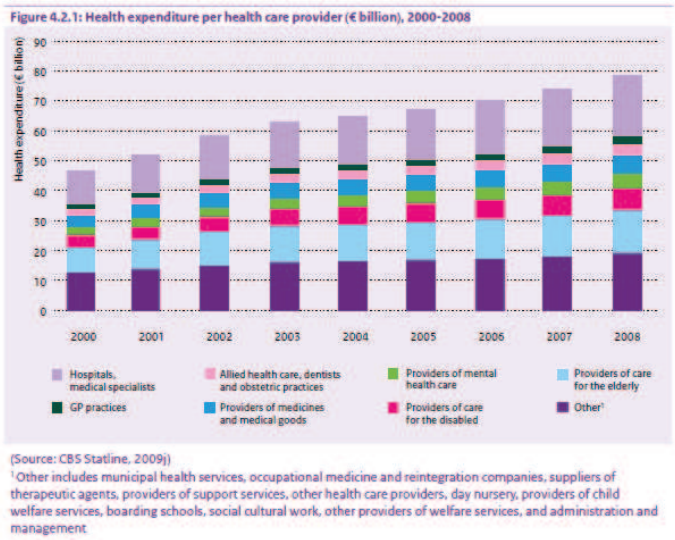

Figure 3.1 Health expenditure per health care provider 2000-2008 (€ billion) (Westert, van den Berg et al. 2010: 154).

3.2 Hospital regulations

Hospital Provision Act (in Dutch: Wet ziekenhuisvoorzieningen WZV (1961 – 2006)
After the rebuilding of the nation in the period following the Second World War, there was a period of strong economic growth. The health care sector also took advantage of this and grew in terms of capacities and facilities. Later, in 1968, the Exceptional Medical Expenses Act (in Dutch: Algemene Wet Bijzondere Ziektekosten, AWBZ) came into force. This act was for major medical expenses not covered by health insurance companies and applied to every Dutch citizen who lived or worked in the Netherlands. However, health care spending rose rapidly and in order to control health spending and the construction boom of (expensive) hospitals the government introduced a number of measures, including the Hospital Provision Act (WZV). This law made it possible for the central government to influence the construction of hospitals.

Hospitals were able to get a guarantee for property investments from the Guarantee Fund for the Health Care Sector (in Dutch: Waarborgfonds voor de Zorgsector). With the guarantee hospitals could lend money against a low interest rate because the WfZ guaranteed to financiers the payment of interest and repayment. The investments in property were compensated by the Dutch Healthcare Authority (in Dutch: Nederlandse Zorgautoriteit, NZa), after the Netherlands Board for Hospital Facilities (in Dutch: College Bouw Zorginstellingen, CBZ) had given a licence to institutions. In this system hospitals got compensation for their capital costs on the basis of subsequent costing (in Dutch: nacalculatie) of the normalized building surface area, independently of the occupancy rate or the realized production. Thus, hospitals did not bear the risks of their property investments.
This did not encourage hospitals to be efficient with their real estate, because they would be compensated for their costs once the guarantee had been delivered by the CBZ. This was often a reason for hospitals to spend large amounts of money on new construction, expansion or renovation of healthcare property, because the housing costs would not be charged. The aim to maximize real estate must be replaced by the aim to optimize real estate (Verweij and Bisschop 2006).

Introduction of the Health Care Establishment Licensing Act (2006-present)
In government circles the notion grew that deregulation and the transfer of responsibilities to the market could contribute to cost control and this could lead to a more efficient and simpler "control" of health care. For this reason a new legislative framework was introduced: the Healthcare Market Regulation Act (in Dutch: Wet marktordening gezonheidszorg, Wmg), the Health Care Establishment Licensing Act (in Dutch: Wet toelating zorginstellingen, WTZi), the Health Insurance Act (in Dutch: Zorgverzekeringswet, Zvw) and the modernized AWBZ. Instead of supply, a control on demand was imposed through a law modification, in which the ZVW and AWBZ regulate the rights of citizens. The WMG provides rates for the performance by health care institutions. The WTZi determines which health care institution can provide these rights and makes demands upon the management, the operational management and the construction of health care facilities. Before January 1, 2008 hospitals had to pass through several phases it they wanted to construct a new building under the WTZi. Under the WTZi, which replaced the WZV on January 1, 2006, the approval of the sketch phase as an independent assessment phase was abolished. For a construction project, hospitals used to apply for a license to the CBZ. Since January, 1 2008, the license duty has been expired and the construction regime has been abolished.
This gives hospitals the freedom to invest in health care facilities for their own account and risk and to make the investments which are necessary to anticipate on the core question of consumers (NZa 2009a: 19).

Hospital regulations after 2008
Nowadays, hospitals do not need an authorization of the CBZ for the financing of investments in buildings, plant and land. Since January 1, 2009 hospitals must earn enough to repay the construction of new buildings, now only still in the B-segment (NZa 2009a: 19).

The legalization changes have far reaching implications for how health care institutions deal with their real estate. Hospitals will have to aim for optimizing their real estate rather than for maximizing their real estate. In addition, hospitals should take into account the expected demand and the nature of demand. Hospitals will need to consider the need for health care to control the real estate costs. This makes it possible to change from thinking of historical cost (based on subsequent calculation) towards thinking of future cash flows, as is usual in the private sector (Hoepel 2006). The goal is to stimulate health care institutions to deal effectively with their real estate.

Responsibility allocation

Through changes in the health care policy there are more possibilities for health care institutions and health care insurers to "supply and purchase health care according to their own opinions and to distinguish themselves from competitors" (NZa 2009b). The government sets the framework and the NZa acts as supervisor.

Three parties can be distinguished: the care consumers (patients who need care), health insurers and health care providers (for example: hospitals, general practitioners and pharmacies). Figure 3.2 shows three markets: health care market, health care purchasing market and health insurance market. Through this division of roles and the combined action between health insurers and health care providers there is "an incentive to work effectively and efficiently, to deliver high quality and to develop social entrepreneurship" (NZa 2009b). The introduction of the performance costing has an impact on the manner in which health care providers and health insurers negotiate with each other.

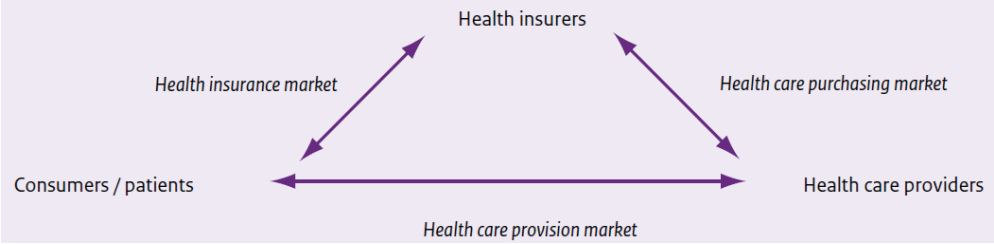

Figure 3.2 Responsibility allocation (Westert, van den Berg et al. 2010: 207).

From function-specific budgeting to performance costing

This paragraph discusses the old funding system for hospitals, function-specific budgeting (in Dutch: functiegerichte budgettering, FB-budget) and the new funding system, performance costing. Since 1987, the FB-budget applies to health care institutions. The budgets of the health care institutions are determined by the NZa. Health care institutions get one fixed budget. The capital costs are part of the budget. On the basis of an approved investment, health care institutions will get a restitution of their costs of capital (interest and depreciation).

The FB-budget provides certainty but a limited freedom. As a result, the FB-budget is no longer appropriate within the new health care system in which health insurers and health care institutions are free to enter into contracts. The result is that the Minister wants to introduce performance costing (Havermans 2008: 15).

By the introduction of performance costing hospitals will be responsible for all investments decisions and their financial consequences (Havermans 2008: 16). Individual health providers negotiate with health insurers about the price, volume and quality of a product. The capital costs are part of the fees of the health care provider (Havermans 2008: 16).

The Minister of VWS has decided to extend the B-segment from 20 per cent to 34 per cent on January 1, 2009. This is stated in the letter "Waardering voor Betere Zorg II" sent on May 28, 2008 to the Second Chamber.

On December 1, 2008 the NZa gave the advice to move in 2011 to performance costing based on a new product structure, transparent diagnosis treatment combinations (in Dutch: DBC's Op weg naar Transparantie, DOT) (NZa 2011). In the letter of December 19, 2008 'Waardering voor Betere Zorg III' of the Minister of VWS it is indicated what is the Minister's intention specialist medical care. In line with the recommendation of the NZa it is indicated that the FB-budget will be abolished and the performance costing will be introduced in 2011. The Minister considers a transition path necessary for the introduction of performance costing (NZa 2011).

The NZa published the implementation test 'van Budget naar Prestatie' on November 2, 2009. The NZa indicates that 'the new product structure DOT is a necessary precondition for the introduction of performance costing

(Ziekenhuis Gelderse Vallei 2009: 52). This publication also indicates how the introduction of performance costing is adopted to the three-segment model (Dutch: drie-segmentenmodel). According to this model, a distinction is made between: a free segment, a regulated segment and a fixed segment (NZa 2009b: 32-33).

- Free segment: this is similar to the current B-segment and consists of free volumes and free prices.
- Regulated segment: has integrated maximum fees. This segment includes the care under the Special Medical Treatments Act (in Dutch: Wet op de Bijzondere Medische Verrichtingen, WBMV), intensive care and expensive medicine. Compensation of medical specialists is based on the current system of standard times and hourly rates.
- Fixed segment: These are care functions of which it is not possible or desirable to directly link them to care products. It concerns care functions which must be always available for patients.

The NZa recommends the use of the 'integrale ingroeimodel' (Z-value model) for the transitional period. Simultaneously the NZa recommends extending the B-segment to 50%. However, the Z-value model must also be opted for (NZa 2011).
In the letter 'Waardering voor Betere Zorg IV' of January 19, 2010, the Minister of VWS has presented his plans to the Second Chamber. This letter is in accordance with the recommendation of the NZa. The plans of the Minister are largely in line with the recommendation of the NZa formulated in the 'uitvoeringstoets'. This means it is the government´s intention to take set further steps by introducing in 2011 performance costing, on condition of:

- The setting-up of the new production structure: DOT.
- Extension of the B-segment from 34% to 50%.
- Divides health care into three (price) segments.
- Applies a temporary transition model to both the regulated and the free segment for at least one year (Ziekenhuis Gelderse Vallei 2009: 52).

After the fall of the cabinet Balkenende IV the letter 'Waardering voor Betere Zorg IV' became controversial. This means that there is uncertainty about the future policies of the government.

On January 26, 2011, the Minister of VWS, Mr. Schippers wrote a letter to the Second Chamber about her policy objectives (Schippers 2011). In the letter states the following:

- The fixed hospital budget disappears and the current wrapped product structure will be strongly simplified.
- The number of freely negotiable prices will also be extended. Thus, hospitals can be rewarded for their performance. The Minister will also make it easier to attract private capital. This encourages innovation, efficiency and, ultimately the quality of health care.
- At the same time the Minister wants to make it possible for providers of medical specialist care to share profit under specific conditions. In theory, this plan will reduce the dependence on banks to obtain capital. Thus, the Minister continues to extend market forces in the health care.

Foundation
The legal form of almost all Dutch hospitals is the foundation. A foundation is "a legal entity, set up by individuals or institutions, with the purpose to support charitable institutions in line with its goals for which it is funded by endowments or grants" (Muller 2007).
According to Gowrisakaran and Town (1997) (in Alam, Elshafie et al. 2008) the differences between for-profit and not-for-profit hospitals are the following. First, for-profit hospitals have as primary objective maximizing profit and creating shareholder wealth. Not-for profit hospitals look for a combination of profit and quality. Second, not-for-profit hospitals often have a tax-exempt status because of the tax codes. Third, the only sources of capital for not-for-profit hospitals are debt, cash flow and philanthropy. As a consequence, these hospitals cannot issue equity. This leads to different costs of capital between for-profit and not-for-profit hospitals. Fourth, for not-for-profit hospitals are allowed to make profit but not to distribute profit to their founders. The profits should be reinvested in the health care.

4 Financial ratios

In this chapter the various financial ratios that are relevant for a general hospital are described. First of all, I clarify the definition of "financial ratio" and the related terms in section 4.1. In section 4.2, the classification of financial ratios will be described. In section 4.3, the methods to compare financial ratios will be explained. In section 4.4 till 4.9, the various financial ratios will be analysed. In section 4.10, the limitations of financial ratios will be given. In section 4.11, a summary will be given. This chapter answers research question two: What are relevant financial ratios to determine the financial performance of Dutch general hospitals?

4.1 Definitions

Definition of ratio

In the literature several definitions for the numbers that indicate the financial situation of an organisation can be found (for example: ratio, indicator and so forth). To avoid confusion, it is important to define clearly what is meant by each term.

According to Vecht and van der Wel (1997: 44) an indicator is "a number in which the scope of a certain phenomenon is expressed, so that that scope lets know itself from a number". According to Vecht and van der Wel (1997: 44) an indicator is usually a ratio but it can also be an absolute figure, such as the size of the turnover or profit. A proportion number or ratio is related to the proportion between two variables (Vijn 2003: 32). A ratio is a proportion number between two or more factor from balance sheet or income statement, which have a clear link with each other (Ooghe and van Wymeersch 1997: 11). However, an indicator can also be an absolute number. The purpose of an indicator is to get a better understanding of the performance and the financial structure of a company at a certain moment (Ots 2006: 352). In this research the term ratio is used, because the proportion between two variables from the balance sheet, income statement or cash flow statement are analysed.

Other definitions

According to Altman and Hotchkiss (2006), bankruptcy is defined as "a failed formal petition of bankruptcy with the courts under the National Bankruptcy Act". Insolvency refers to technical insolvency and insolvency in the bankruptcy sense (legal). Technical insolvency refers to "the situation when an organisation cannot meet its current obligations signalling a lack of liquidity". Thus, the current liabilities exceed the current assets, whereby insolvency in the bankruptcy sense (legal) is more critical and usually indicates an underlying chronic instead of a temporary condition. An organisation is in this situation when its liabilities exceed its total assets. This means that the real net worth of the organisation is negative. Finally, default is "the situation in which an organisation violates a condition of an agreement with a creditor and cause legal action to be taken" (Vos 2009). Credit worthiness means assessing who or which enterprise was 'worth a credit' (Čančer and Knez-Riedl 2005).

4.2 Classification

The literature and practice use many manners to classify financial ratios. For example to the aspects of the company on which they are related or to the financial document (Wytzes, 1978: 58) in (Bilderbeek 1983: 18).

The first classification is as follows:

- Liquidity ratios

- Profitability ratios
- Leverage ratios
- Activity ratios
- Growth rates

The second classification is as follows:

- Ratios derived from the balance sheet
- Ratios derived from the income statement
- Ratios derived from a combination of the balance sheet and the income statement

A standard Dutch hospital's balance sheet, income statement and cash flow statement can be found in Appendix I, Appendix II and Appendix III, respectively. The first classification is used in this research, because this classification takes into account the different types of ratios.

4.3 Comparison

The process of analysing a financial statement can be done in several ways. In this section the following ways will be discussed (Zelman, McCue et al. 1999: 76):

- **Vertical analysis:** analyses the percentage change in a component of a total. For example, the change in percentage current assets. Vertical analysis use the following formula: (line item of interest/ base line of interest)* 100.
- **Horizontal analysis:** analyses the percentage changes in a financial statement component from one year to the next year. For example, the increase in operating income from one year to the next year. Horizontal analysis use the following formula: [(subsequent year - base year)/ base year]* 100.
- **Comparison with a standard:** an organisation's financial statement can be compared with a(n) (industry) standard or with other organisations.
- **Ratio analysis:** analyse the relationships between two components of the financial statement. For example, the operating profit margin measures the relationship between the earnings before interest and taxes and the total revenue. The ratio analysis provides a better understanding of a financial situation of the organisation than either of these data standing alone (Chabotar 1989). A ratio gives an contribution by means of a warning function (Vijn 2003: 32). The warning function can relate to: an actual situation, a standard or a relation between a fact and a norm (Vijn 2003: 33).

Financial ratios as predictors of bankruptcy

Financial researchers have combined several financial ratios into models, which predict bankruptcy of a firm. Ratios viewed alone can be misleading and do not provide the complete story. A statistical model to determine the bankruptcy of a firm is the Z-Score on the basis of five financial ratios developed by Altman. He uses a "multiple discriminant analysis (MDA) to separate the creditworthy sheep from the impecunious goats" (Ross, Westerfield et al. 2008: 661). The disadvantage of this model is that it uses data from the past to forecast the future. The original Z-Score is modified if the firm's stock is not publicity traded. Therefore Altman revised the original model to the Z'Score.

The modified version is most applicable for not-for profit hospitals (Price, Cameron et al. 2005). The Z'Score formula is as follows:

$Z' = 0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5.$

Where:
X1 = net working capital/ total assets

X2 = retained earnings/ total assets
X3 = earnings before interest and tax/ total assets
X4 = book value of equity/ book value of all liabilities
X5 = net operating revenue/ total assets

In table 4.1 the overall value for the Z'Score is described.

Table 4.1 Revised Z'Score Model: Classification Results, Group Means, and Cut-off Boundaries (Altman 2000).

Z'Score	Classification
Z > 2.90	non-bankrupt
1.23 < Z ≤ 2.90	gray area (or ignorance zone)
Z ≤ 1.23	Bankrupt

If the value is less or equal to 1.23, than is action necessary to survive and to avoid bankruptcy. A value between 1.23 < Z ≤ 2.90 indicates that major changes are necessary to avoid bankruptcy (Price, Cameron et al. 2005).

There is not sufficient data available of default/ insolvent Dutch hospitals, because the limited number of bankrupt hospitals reduces statistical power. In addition to this, the use of accounting data has several disadvantages. Namely, that there is only financial data available from Dutch hospitals in 2007 and 2008. Otherwise, for hospitals the accounting regulations are changed and this affects the financial situation of hospitals. Differences in accounting methods represent measures errors and this affects the predictive ability of the Z'score.

In order to find out the most important financial ratios a literature research has been conducted about financial ratios and financial institutions (banks and WfZ) are interviewed.

4.4 Liquidity ratios

The liquidity indicates an organisation's ability to meet its short-term obligations. Thus, liquidity ratios are important for short-term creditors (Ross, Westerfield et al. 2008: 47). The liquidity can be calculated on two ways (van der Putte and Rienstra 2008: 63):

- **The static liquidity:** measures the current assets in relation to the current liabilities. This indicates the degree to which an organisation can fulfil short term debt obligations in the short term. The static liquidity can be determined with the balance sheet.
- **The dynamic liquidity:** this ratio looks in a specific period (usually one year) to the incoming and out coming cash flows of an organisation. On the basis of the cash flow statement the dynamic liquidity can be determined.

4.4.1 Static liquidity

Liquidity ratios answer the question, "How well is the organisation positioned to meet its current obligations?" (Zelman, McCue et al. 1999: 89). The liquidity ratios can be calculated in several ways (van der Putte and Rienstra 2008: 63):

- Current ratio [X1]
- Quick ratio [X2]
- Cash ratio [X3]
- Net working capital ratio [X4]

Current ratio [X1]
The current ratio is the proportion of current assets to current liabilities and measures the number of times short-term obligations can be paid using short-term assets. Values below 1.0 time indicate that a company cannot pay its current liabilities with its current assets.

However, assessment of the current ratio is because quick convertible inventories less relevant for hospitals. Therefore it is better to analyse the quick ratio (Kesteloot and van Herck 2008: 151). This is also indicated by Vecht and van der Well (1997: 57), they state that "when there are little or no inventories, or when the value of the inventories is very uncertain, the current ratio has only a secondary meaning.

Quick ratio [X2]
The quick ratio calculates only the most liquid assets, therefore the inventory is excluded. This ratio measures the cash, marketable securities and receivables in relation to the current obligations.

Cash ratio [X3]
The most liquid assets of a company are cash and marketable securities. Therefore an analyst looks at the cash ratio (Brealey, Myers et al. 2008: 795). Cash can be explained as the ultimate ratio of an organisations debt-paying ability. In practice the cash ratio is usually regarded as 'too conservative', because "it assumes implicitly that the expected short-term cash flow from receivables is zero, which is rarely the case even though a large portion of receivables is slow or delinquent" (Beaver 1968).

Net working capital ratio [X4]
The current ratio can be manipulated by window dressing. A payment of current debt just before the financial statement date results in an improvement of the current ratio. The advantage of the net working capital is that it is free from manipulation such as window dressing (Beaver 1968). The net working capital ratio is defined as the net working capital divided by the total assets. Net working capital ratios less than one indicate a negative working capital. This means that an organisation maybe cannot meet its short-term liabilities.

4.4.2 Dynamic liquidity

The ratios in this section are an item from the income statement that is connected with an item from the balance sheet. The following turnover ratios can be calculated (Vijn 2003: 46):

- Inventory and work in progress turnover [X5]
- Receivables turnover [X6]
- Payable turnover [X7]
- Days in inventory and work in progress [X8]
- Days in accounts receivable [X9]
- Days in accounts payable [X10]
- Operating cycle [X11]
- Days cash on hand [X12]

Inventory turnover and work in progress [X5] and days in inventory and work in progress [X8]
The inventory turnover measures how many times in a year the inventory turnover (Karanovic, Bogdan et al. 2009). According to Karanovic, Bogdan et al. (2009) a low value indicates "that a company management has involved too much money in stocks, which represent assets that is not productive, and for which the company does not have a refund". The higher the inventory turnover, the more efficiently an organisation is managing its inventory (Ross, Westerfield et al. 2008: 50). The inventory turnover calculates how long the turnover on average took. This is how many days inventory sits before it is sold (Ross, Westerfield et al. 2008: 50).

Since the inventories are not appreciated against sale prices the inventories are considered against cost price. Only from the annual accounts the cost price of the turnover is mostly not retrieved. Hence with the turnover these ratios are calculated (Vijn 2003: 47).

Receivables turnover [X6] and days in accounts receivable [X9]
The receivables turnover can be converted into days in accounts receivable (365 days/ receivables turnover). This ratio is also called the average collection period (ACP) "A large number of days represent cash that is unavailable for use in its operations"(Ross, Westerfield et al. 2008: 51).

Payable turnover [X7] and days in accounts payable [X10]
The payable turnover indicates how quickly an organisation pays its bills. A high ratio indicates that there is a relatively short time period between purchasing inventory or materials and paying them. The payable turnover can be calculated as days in accounts payable (365/ cost of goods sold/ accounts payable) or 365/ accounts payable turnover)). According to Zelman, McCue et al. (1999: 93) "in order to develop a credit-worthy relationship and goodwill with vendors and suppliers, health care organisations should attempt to pay their bills on time".

Cash conversion cycle [X11]
The operating cycle is defined as "the interval between the arrival of inventory stock and the date when cash is collected from receivables" (Ross, Westerfield et al. 2008: 749). Another ratio, the cash cycle "begins when cash is paid for materials and ends when cash is collected from receivables" (Ross, Westerfield et al. 2008: 750). The operating cycle and cash cycle differ between industries.

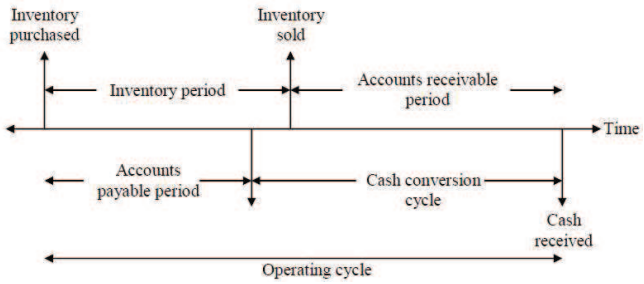

Figure 4.1 The cash conversion cycle (Ross, Westerfield et al. 2008: 749).

Days cash on hand [X12]
The days cash on hand indicates the number of day's expenses can be covered with cash. This ratio can be calculated by taking the sum of cash and short-term investments and dividing it by total expenses minus depreciation divided by 365. A high ratio indicates a better financial status. However, a too high value implies less optimal utilisation of the organisations' resources.

4.4.3 Comments

An advantage of analysing the current assets and liabilities is that their book and market values are likely to be similar, because these assets are just a short period in an organisation and will be therefore not strongly impaired. Otherwise, the amount of current assets and liabilities can change rapidly. So may be the today's amount is not a reliable amount for the future (Ross, Westerfield et al. 2008: 47).

An example of window dressing is that an organisation borrows long-term and hold the proceeds in cash and short-term securities. The current and quick ratio would be improved, but the leverage ratios decrease and so it is possible to detect that the current ratio is manipulated (Cleverley 2007).

Receivables turnover indicates how quickly hospitals payments will be collected. If claims cannot be recovered in time then it can be so that hospitals must pre-finance claims with short-term debt, what is expensive (Kesteloot and van Herck 2008: 151).

4.4.4 Standards

According to Ross, Westerfield et al. (2008: 47) a minimum current ratio of 1.0 time would be expected, because a current ratio of less than 1.0 means that current liabilities exceed current assets. According to Karanovic, Bogdan et al. (2009) the standard rule for the current ratio is 2:1, but it is important to be careful with the generalization of this rule. This rule means that current assets should double current liabilities. They note that "usually creditors and supplier prefer a higher ratio because the larger the coefficient of current ratio is safer collecting of their debts". This is correct but on the other hand indicates a high current ratio two problems (Karanovic, Bogdan et al. 2009). First the company has too much money in unproductive assets, for example financial assets or receivable. Second the organisation has too much money in inventory. A disadvantage of the current ratio is that it does not indicate how much the size is of the different components of current assets.

4.5 Leverage ratios

Leverage ratios indicate an organisation's degree of debt and how large its capacity is to fulfil the long-term debt obligations (Kesteloot and van Herck 2008: 155). These ratios are sometimes called solvency ratios. Two common types of financial leverage ratios are: structural and coverage ratios. Structural ratios show the proportions of debt and equity in an organisation. Coverage ratios measure the relationship between debt servicing commitments and the sources for meeting these burdens (Chandra 2008: 72). In this section both types of financial leverage will be discussed.

4.5.1 Structural ratios

In calculating the leverage on the basis of the balance sheet, the following ratios will be associated with each other: total assets, liabilities and equity. The smaller the equity percentage, the smaller the safety buffer for creditors (Kesteloot and van Herck 2008: 55). Leverage is an important ratio to assess the credit worthiness of an organisation. An organisation with a relatively heaven burden of debt it could may possibly be difficult to attract new capital (Mol 1998: 56). The financial risk is a result of the financing with debts. Debt cause fixed financing costs (interest) and repayment obligations, which must be paid irrespective of the result of an organisation. The more an organisation finances with debt, the higher the debt degree will be and the more interest and repayment by the organisation must be paid. In several ways leverage can be calculated. In principal are these ratios the same they are only calculated on a different way.

- Equity financing ratio [X13]
- Debt-to-equity ratio [X14]
- Debt-to-assets ratio [X15]
- Capital case [X16]
- Long-term debt to capitalization [X17]
- Long-term debt to equity [X18]
- Long-term debt to total assets [X19]
- Fixed asset financing ratio [X20]
- Budget ratio [X21]
- RAC-ratio [X22]

Equity financing ratio [X13]
This ratio indicates the equity to total assets and is also called the equity financing ratio (RVZ 2006: 23).

Debt-to-equity ratio [X14]
This ratio determines how much debt an organisation has relative to one euro equity. If this ratio is higher than 1, than the majority of an organisations assets are financed with debt.

Debt-to-assets ratio [X15]
In addition, the leverage can also be calculated as a percentage of total leveraged assets. This ratio actually indicates the degree to which a company is able to repay lenders (van der Putte and Rienstra 2008: 66). According to Karanovic, Bogdan et al. (2009) a "too high debt ratio of company can signal a problem of significant allocation funds for payment obligations or may represent a lack for further borrowing". Vijn (2003: 56) indicates with respect for the above ratios that the greater the equity, the smaller the repayment obligations for the debt the more favourable the leverage of a company.

Capital case [X16]
According to Vijn (2003: 56-57) this ratio calls the capital case. Compared with equity have subordinated loans some risk-bearing aspects. The proportion between the capital case and the total assets can be calculated by dividing the capital case by the total assets (Vijn 2003: 57).

Long-term debt to capitalization ratio (capitalization) [X17]
This ratio measures the proportion of long-term debt by an organisation's permanent (long-term) financing structure. The difference between this ratio and the debt ratio is that this ratio analyses long-term debt (permanent) capital. The advantage of this ratio is, that it is not affected by short-term financing decisions (Gapenski 2009).

Long-term debt to equity [X18]
The ratio measures the proportion of long-term debt to equity. The higher the ratio the greater a company's leverage. A higher ratio indicates normally a riskier organisation, because the organisation has more debt and less equity.

Long-term debt to total assets [X19]
This ratio indicates a company's amount of long-term debt to its total assets. Some analysts focus on long-term debt instead of total debt. A high long-term debt to total assets ratio indicate that an organisation had significantly borrowed. In addition, a high ratio indicates, in general, that much interest must be paid on the principle amount of the borrowed and this affects a company's profit. Thus, for an organisation a high ratio might show difficulties to attract new long-term debt.

Fixed asset financing [X20]
This ratio can be calculated by dividing the net fixed assets by long-term debt. Thus, this ratio focuses on the fixed assets instead of on the total assets or on the permanent assets (debt-ratio and capitalization ratio). The fixed asset financing (FAF-ratio) gives an indication of the creditors' risk (Gapenski 2009).

Budget ratio [X21]
The leverage can also be calculated as a proportion between the budget and the equity instead of the total assets. According to Feenstra, van Helden et al. (2010) the main reason to do this is the comparability with other health care institutions, because of the accounting practices for hospitals, the total assets are larger for hospitals that recently construct a new building than for hospital buildings that were build several years ago. Thus, hospitals are better comparable on the basis of budgets.

However, the budget ratio is influenced by the size of the budget. Hospitals that have relatively new buildings and still to capital allowance (in Dutch: kapitaallastenvergoeding) are entitled have a higher budget than hospitals that have fully depreciated buildings and no longer to the capital allowance are entitled. This leads to a lower budget ratio for hospitals with fully depreciated buildings, than for hospitals where the hospital buildings have not been fully depreciated.

RAC-ratio (Reserve acceptable costs (Dutch: Reserve aanvaardbare kosten (RAK-ratio)) [X22]
For future expenditures or unforeseen circumstances, financial institutions are allowed to hold financial reserves. In the past, the maximum amount of the reserve acceptable costs was restricted by the government. In addition, the government bears the financial risks for health care institutions (Westert, van den Berg et al. 2008: 148). The RAC indicates the proportion of collectively financed tied-up capital (in Dutch: collectief gefinancierd gebonden vermogen) to Wtg-budget (Westert, van den Berg et al. 2008: 148).

4.5.2 Coverage ratios

The coverage ratios measure the ability of an organisation to cover interest (and principal repayment) expenses. The most important coverage ratios are (Chandra 2008: 72):

- Interest coverage ratio [X23]
- Cash coverage [X24]
- Fixed charges coverage ratio [X25]
- Debt service coverage ratio [X26]
- Cash flow coverage ratio [X27]
- Cushion ratio [X28]
- Capital expense ratio [X29]

Interest coverage ratio [X23]
The ICR indicates to which part interest payments are covered by the result (after depreciation, but for interest and taxes; EBIT or earnings before interest and tax). A high ratio indicates a better ability to meet interest obligations and a lower indebtedness (Karanovic, Bogdan et al. 2009).

Cash coverage ratio [X24]
A possibility is to add to the nominator the annual depreciation and to the denominator the repayment of the long-term debt. The idea is that the cash flow of the total result and the annual depreciation must be sufficient to fulfil the interest and repayment obligations (Vijn 2003: 58). If applicable then will be added the amortization of intangible assets added with impairment of the activated goodwill. Thus, the cash coverage ratio calculates the EBITD(A) divided by the interest expense.

Fixed charges coverage ratio [X25]
The fixed charges coverage ratio indicates "how many times the cash flow before interest and taxes covers all fixed financing charges" (Chandra 2008: 74). So, this ratio considers the interest and principal repayment obligations. Therefore it is a comprehensive indication of the organisation's leverage. This ratio is equal to the net earnings before taxes plus interest charges paid plus long-term lease payments in relation to interest charges paid plus long-term lease payments (Gapenski 2009).

Debt service coverage ratio [X26]
A high ratio indicates that the organisation has enough sources to fulfil credit obligations. A ratio of 1.0 indicates that "average income would just cover current interest and principal payments on long-term debt" (Governors State Universtiy 2004). This ratio is a coverage ratio and is banking interesting because this indicates which part of

the income can be spent on debt obligations (Vos 2009: 153). In the credit covenant minimum values for the DSCR can be agreed (RVZ 2006: 23).

Cash flow coverage ratio [X27]
The cash flow coverage ratio is the EBDA divided by the total debt payments. A cash flow coverage ratio greater than 1.0 indicates that an organisation is able to service the debt on its profit (Gapenski 2009).

Cushion ratio [X28]
The cushion ratio measures the ability to meet debt obligations. This ratio can be calculated by dividing the cash and the short-term investments by the debt principal payments and the interest expense. A high cushion ratio indicates that a hospital has cash reserves and short-term investments available to meet debt payment obligations.

Capital expense ratio [X29]
The capital expense ratio calculates capital expenses as a percentage of total expenses. Capital expenses consist of interest and depreciation and are considered as fixed costs. The higher the value of this ratio, the higher would be the fixed operating costs.

4.5.3 Comments

For hospital managers are the following aspects important with using leverage ratios (Chandra 2008: 73):

- There are objections to assess an organisation on the basis from (static values of) the balance sheet, because assets can be valued at their historical values less depreciation and not at market values. At the same time, by entering up goodwill at the expense of its own capacity the leverage of an organisation can be influenced (Vijn 2003: 61). Vijn (2003: 62) indicates that the liquidity value of assets is important, because this indicates the risks for banks at the moment of bankruptcy. Otherwise, the liquidation value is, in general, not available for a 'going concern'.
- From charges on specific assets some forms of debt (for example, long-term loans) can be protected and hence enjoy superior protection.

RVZ (2006: 24) indicates that hospitals equity capital should be built up with positive operating results. Into account should be taken the relation of hospitals with the government, because "building up equity by a health care institution can raise the tendency to restrict funds". Otherwise, hospitals need equity capital as a buffer for financing and to absorb operating losses.

Debt service coverage ratio
The debt service coverage ratio is influenced by the profitability and the depreciation. So it can be that "in the early years after a major construction project has been completed, the depreciation expense may be quite large" (Governors State Universtiy 2004).

4.5.4 Standards

There are no solvency standards, "in the sense that a lower equity financing ratio could be assessed as unsatisfactory, and vice versa" (Vecht and van der Wel 1997: 65). However, the lower the equity financing ratio, the larger the risk is that creditors lose their given capital (Vecht and van der Wel 1997: 65). If the equity financing ratio is higher than a financial institution is more likely to give a loan, then if the ratio is small (Kesteloot and van Herck 2008: 156). As standard for the equity financing ratio is sometimes given 50 per cent. This implies that equity capital is at least equal to debt (Kesteloot and van Herck 2008: 156).

Vos (2009: 36) indicates the equity financing ratio standard that banks use depend on the type of company. In table 4.2 for several types of companies' solvency standards are given.

Table 4.2 Type of company and equity financing ratio (Vos 2009: 36).

The type of the company	Equity financing ratio	
	Insufficient	Sufficient
a) Produces, industry, construction	< 20 %	> 30 %
b) Wholesale, transport, retail	< 15 %	> 25 %
c) Service, independent profession	< 10 %	> 15 %
d) Other	< 10 %	> 25 %

According to Vijn (2003: 65) the profitability expectations affect the credit worthiness of an organisation. Thus, there are for companies with a higher profitability less stringent solvency standards. The equity financing ratio is also affected by: the degree of sensitivity for and of response capacity on cyclical and structural developments in the economy also affects the solvency standard. The collateral can also be an important factor to increase or decrease the solvency standards.

Vos (2009: 200) indicates that an organisation can have a high solvency but meanwhile an empty backlog of orders or the organisation has obligations which cannot be financed from the cash flow. In addition, indicates Vos (2009) that an organisation with a positive solvency can be insolvent and an organisation with a negative solvency is not immediately insolvent.

Kesteloot and van Herck (2008: 156) indicate that subordinated loans must be added to the equity. However, secured debts should be segregated. The inventory that is in some hospitals hidden as reserves must added to the equity and the establishment costs must be removed from the equity, because creditors analyse fictitious equity from the collateral.

Debt service coverage ratio

RVZ (2006: 22) states that EBIT must be minimal 20% higher than the interest and principal payments (in formula: 1,2 < DSCR < 1,4). In addition, RVZ (2006: 22) notes that the particular value of the DSCR depends on several factors. First, at the present hospitals are mainly financed with long-term debt (40-50 years) as a result the principal payments are limited. If banks require a shorter duration of the loan than will this increases the annual payments. Second, in the future hospitals should properly pay higher prices on the capital market, thus to still meet the interest and principal obligations the result should be increased.

Guarantee Fund for the Health Care Sector

In the past, the WfZ applies to be a member of the fund a minimum equity financing ratio of 8 per cent. In the present and future situation the required equity financing ratio increases to a (market-conformable) 10 - 15 per cent ((WfZ, 2007 in (Havermans 2008)), because of the increasing risks for health care institutions. A guarantee of the WfZ is financially attractive for hospitals, because the interest rate will be lower with a guarantee of the WfZ.

Table 4.3 Accession criteria and monitoring forms WfZ 1997 (TK 25 627, 1997).

	Accession	Watch
Equity financing ratio > 8%	judgement:	
	± solvability/ profitability	normal attention
Equity financing ratio > 5%; < 8%	judgement:	
	± solvability/ profitability	normal attention
	± quality of the management	normal attention
Equity financing ratio > 2%; < 5%	judgement as definite	
	risk factors	increase watchfulness
Equity financing ratio > 0%; < 2%	in-depth credit investigation	special attention
Equity financing ratio < 0%	rejection	

The NZa estimates for hospitals an equity financing ratio of 10 to 15 per cent on the basis of the increasing risks due to performance-based costing (in Dutch: prestatiebekostiging) and other environmental factors (NZa 2008: 27). In the future, a equity financing ratio of 20 to 30 per cent is more realistic (RVZ 2006: 23) RVZ (2006: 24) notices that banks can set a higher equity financing ratio, because the alternative use of hospital buildings is limited.

4.6 Profitability ratios

Profitability ratios involve a result, in relationship with the source of the result. The result is achieved during a year, therefore it is a flow variable (Vijn 2003: 69). This category includes two types of profitability ratios: profitability ratios in relation to sales and profitability ratios in relation to investment (Monica, Sorin et al. 2008). These ratios indicate together the profitability of an organisation.

4.6.1 Profitability ratios in relation to sales

These ratios measure the relationship between the profits and the sales of a hospital. The eight most important profitability ratios based on the profit and loss account are:

- Gross profit margin [X30]
- Operating profit margin [X31]
- Net profit margin [X32]
- Cash flow margin [X33]
- Free cash flow margin [X34]
- Free operating cash flow margin [X35]

Gross profit margin [X30]
Gross margin indicates how profitable an organisation is if looking at its activities (Governors State Universtiy 2004). Gross margins vary between industries, for example grocery stores have a low gross margin, approximately two per cent. On the other hand is the gross margin for the pharmaceutical industry about 18 per cent (Ross, Westerfield et al. 2008: 53). Vijn (2003: 72) indicates that the gross margin can be a good ratio to measure the competitiveness of organisations and the degree of cost control.

Operating profit margin [X31]
This ratio indicates the operating leverage of a company from the operational activities. It measures the relationship between the earnings, before, interest and taxation (EBIT) and the revenues (Monica, Sorin et al. 2008).

In for-profit hospitals require shareholders a 'bottom-line' profit to pay dividend on their investments. The 'bottom line' profit can be achieved by "negotiating managed care contracts and company-wide group purchasing discounts, centralized administrative functions, and more sophisticated monitoring programs and operating controls" (Governors State Universtiy 2004). According to Vos (2009: 207) is a decrease in operating profit margin one of the main ratios that there is something wrong possible, because the demand is under pressure or the organisation is not able to stand up the competition.

Net profit margin [X32]
Net profit means the part left after deducting tax and profit share. This ratio includes depreciation and other non-cash expenses, because only that part is over for shareholders. The net profit margin is the portion of the net profit to revenues. According to Vecht and van der Wel (1997: 56) the net profit margin is "not a good indication

of the profitability of an organisation". Because the net profit margin includes not only profitability aspects but also solvency aspects. Thus it can be that the net profit margin increase, while return on equity decrease. Bilderbeek (1983: 80) states that "only in specific cases, if the organisation has a solvency ratio that is regarded as acceptable by the capital market, the net profit margin provides economic meaningful information.

Cash flow Margin (CF) (EBIDA to revenue) [X33]
A ratio similar to the net profit margin is the cash flow margin, except that the cash margin focuses on the cash flow instead of the accounting income. In this calculation, taxes are seen as cash cost and not added back to net income in the numerator (Gapenski 2009).

Free cash flow margin (FCF) (EBIDA less capital expenditures to (total) revenue) [X34]
The cash flow margin focuses in comparison with the FCF margin on the EBIDA less capital expenditure. The capital expenditures are seen as a necessary cost of the operation. Thus, the rest is truly availably to pay the financial costs. According to Drake (2007) "caution should be applied in interpreting the year-to-year variations in FCF" because "capital expenditures for many companies tend to vary significantly from year-to-year.

4.6.2 Profitability ratios in relation to investment

These ratios indicate the relationship between the profits and the investments of a hospital. There are three key profitability ratios in relation to investment:

- Return on assets [X35]
- Return on equity [X36]
- Return on debt [X37]
- Return on invested capital (ROIC) [X38]
- Return on capital employed [X39]
- Basic earning power [X40]
- Return on net assets [X41]
- Net debt to EBITDA [X42]

It is better to use the average assets (from begin and end of the year), because the assets are likely to change over the course of a year, especially when an item of the profit and loss account is compared with an item on the balance sheet (Brealey, Myers et al. 2008: 796).

Return on assets [X35]
Return on assets (ROA) measures the profit per euro of assets (Ross, Westerfield et al. 2008: 53). The ROA can be calculated before taxes, because the treasury has right on a part of the profit. This ratio gives an indication of the degree to which organisations realised profits with their assets (Vecht and van der Wel 1997: 53). Vijn (2003: 84) gives a comment on the relationship between operating profit and total assets, namely, that the total assets not only results in the operating income but also the interest income and interest cost of financial assets (equity income).

Return on equity [X36]
In for-profit organisations this ratio is called the return on equity (net income/ owners' equity). Thus, for Dutch hospitals this ratio indicates the rate of return for each euro invested in equity.

Return on equity is especially interesting for stockholders, since, it is a measure of how stockholders fared during the year" (Ross, Westerfield et al. 2008: 53). This ratio indicates how much profit an organisation is able to generate for each euro of equity (Vijn 2003: 77). This ratio is affected by three factors (Vijn 2003; Ross, Westerfield et al. 2008: 81 and 56):

1. Operating efficiency (as measured by profit margin);
2. Asset use efficiency (as measured by total asset turnover);
3. Financial leverage (as measured by the equity multiplier).

Return on debt [X37]
The return on debt indicates an organisation's performance based on the amount of debt it has borrowed, in fact, the agreed interest rates (van der Putte and Rienstra 2008: 67). So, the return on debt indicates the average costs of debt capital (Vijn 2003: 77).

Return on invested capital (ROIC) [X38]
This ratio indicates the net income after taxes (NOPAT) to the invested capital. This is a measure of cash generated by each euro of invested capital. The total invested capital can be calculated by taking into account the sum of fixed assets and net working capital. The NOPAT analyse the income, thus interest and revenues from lease activities are excluded from operational revenues (Popa, Mihailescu et al. 2009).

Return on capital employed [X39]
The return on capital employed measures the EBIT in relation to the capital employed. The capital employed can be calculated by total assets minus current liabilities. This ratio gives an indication of the efficiency and profitability of an organisation's capital investments.

Basic earning power [X40]
The basic earning power (BEP) ratio can be calculated by dividing EBIT by total assets. This ratio excludes interest and tax and therefore this ratio is a measure of the basic profitability of organisations' assets, especially when organisations have different debt and tax structures (Brigham and Houston 2009: 97).

Return on net assets [X41]
The return on net assets (RONA) can be calculated by dividing net income by the sum of fixed assets and net working capital.

Net debt to EBITDA [X42]
This ratio can be calculated by dividing total debt by the cash flow (EBITDA). This ratio measures the ability to repay debt obligations from the cash flow (EBITDA). This ratio gives an indication of the time that would be needed to pay off all debt (Investopia 2011a). The higher the value of this ratio, the better an organisation is able to meet debt obligations.

4.6.3 Comments

Vijn (2003: 85) indicates that the annual net profit depends on the chosen depreciation method hospitals. This complicates an industry comparison. Vijn (2003: 85) mentions that a possible solution might be to add the annual depreciation to the profit, moreover, must be taken into account that a hospital cannot share positive results (Kesteloot and van Herck 2008: 157).

Not-for-profit hospitals
As mentioned in chapter 3, for not-for profit hospitals it is "important to cover expenses at a minimum and achieve a break even financial position however maximising profits is not the primary goal of the organisation" (Pardee 2010: 46), because the profits will not be distributed to shareholders.

DuPont system
The relationship between some profitability and efficiency ratios can be linked in a DuPont system developed by DuPont de Nemours. The DuPont system is a convenient way to analyse financial statements. If the ROA or the

ROE are unsatisfactory the DuPont system shows where to focus and determines what items need to improved. The return on assets (ROA) links the net profit margin and the total asset turnover:
ROA = (NPM) (TAT)
Where,
NPM = net profit margin
TAT = total asset turnover

An organisation can have a high net profit margin but a low total asset turnover and thus, uses much recourse to generate the profits; as a result the organisation has a low return on assets. Therefore, it is important to decompose return on assets when analysing an organisation. The return on equity (ROE) can be calculated as follows:
ROE = (NPM) (TAT) (EM)
Where,
EM = equity multiplier

Thus, the ROE is equal to the ROA times the equity multiplier (assets-to-equity ratio) and there are differences, because of the use of debt financing. Figure 4.2 show DuPont analyses of the ROA and the ROE. It takes a detailed look at how the components of an organisation's operations feed into the ROE. The insights provided by the DuPont system are valuable for the monitoring of an organisation's performance.

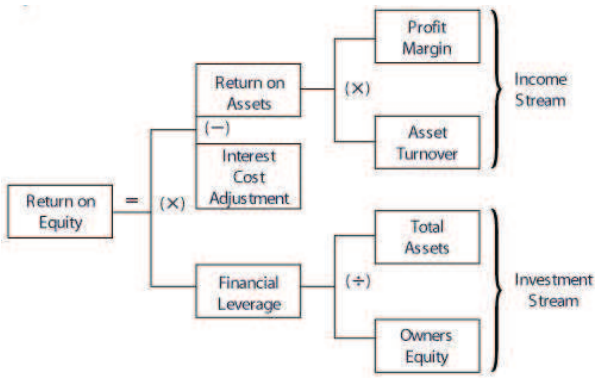

Figure 4.2 DuPont financial analysis model (Gunderson, Detre et al. 2005).

The limitation of the ROIC is that it depends on the book value of the assets on the balance sheet. However, the ROIC gives investors an indication of the performance of an organisation.

4.6.4 Standards

The EVA (Economic Value Added) is a measure of an organisation's economic profit over a specified time period, usually one year. The formula is: EVA = (ROI - WACC) x Invested capital. Thus, if ROI is greater than WACC, a company is creating value. The difference between the ROI and WACC is also called the value spread.
Gupta Strategists (2006) calculates the WACC for hospitals. They calculate a WACC for the A-segment from 5 to 6.5 per cent and for the B-segment a WACC from 5 to 8 per cent. In calculating the WACC (Weighted Average Cost of Capital) Gupta Strategists (2006) estimates the cost of debt for a hospital on 4.3 per cent. Based on a BBB-rating of hospitals and that hospitals do not make use of the bond market. Note, that a project is profitable if the ROI is greater than the WACC. Thus the minimum ROI to create value is approximately 5 per cent.

4.7 Operating cash flow ratios

In accrual financial statements, the balance sheet, and income statement include non-cash revenues and non-cash expense. Price, Cameron et al. (2005) state that the cash flow statement "is ultimately most important for any business (and especially distressed ones) – namely, the cash available from operations for investments". Therefore the realized accrual net income is modified from an accrual basis to a cash basis by analyzing the balance sheet items that have changed during the operation period (Hotel Mule 2010).

Several ratios can be calculated with the cash flow statement. The ratios analyse the liquidity, profitability and leverage of an organisation. In this section the following cash flow from operation ratios will be explained:

- Operating cash flow [X43]
- Operating cash flow to long-term debt [X44]
- Operating cash flow to total liabilities [X45]
- Operating cash flow to total assets [X46]
- Operating cash flow to sales [X47]
- Operating cash flow to interest [X48]
- Operating cash flow to interest, lease and expenditures [X49]
- Operating cash flow to capital expenditures [X50]
- Total free cash flow ratio [X51]

Operating cash flow (OCF) [X43]
This ratio measures the ability to pay the current liabilities from the cash flow from operations and is an indication of an organisation's liquidity. A minimum value of 200 per cent is considered to be desirable (Hotel Mule 2010). The advantage compared to the current and quick ratio is that "the cash flow is for a year and average current liabilities from two successive balance sheets are used" (Hotel Mule 2010).

Operating cash flow to long-term debt [X44]
This ratio can be calculated by dividing the cash flow from operations by the long-term debt (for example: mortgage notes payable, bonds payable and other significant obligations). This ratio indicates "the time it would take to pay back debts assuming that no new long term debts were incurred and that operating cash is used exclusively to repay debt"(Urbancic 2005).

Operating cash flow to total liabilities [X45]
The cash flow to total liabilities ratio focuses on the relation between the cash flow from operations to total liabilities. This ratio determines how much time is needed to cover all the liabilities, if the cash flow is used to repay debt (Price, Cameron et al. 2005). The values on the balance sheet are static, this ratio analyse debt over a year instead of on a specific moment (Hotel Mule 2010).

Operating cash flow to total assets [X46]
The cash flow from operations to total assets gives an indication of an organisation's ability to generate cash flow from its assets. A hospital can use for the denominator total property, plant and equipment instead of total assets. A hospital can compare this ratio with other hospitals (Urbancic 2005).

Operating cash flow to sales [X47]
This ratio gives an indication of a company's ability to collect cash from net operations and calculate the cash generated per euro of sales. This ratio is a better indication of profitability than the profit margin because it considers cash instead of net income (Hotel Mule 2010).

Operating cash flow to interest [X48] and operating cash flow to interest, lease and expenditures [X49]
Price, Cameron et al. (2005) prefer the cash interest coverage ratio above the for example, interest coverage ratio, because this ratio reflects the cash that must be used for interest payments and does not include non cash earnings. "A value less than 1.0 indicates the organisation must take immediate steps to raise cash externally to cover its interest payments". The operating cash flow to capital expenditures [X50] indicates is the same ratio as the operating cash flow to interest [X48] expected that it focuses on all the debt service payments. Therefore, the interest, lease and principal payments are included.

Operating cash flow to capital expenditures [X50]
Cash flow from operations to capital expenditures measures the ability of a company to finance capital expenditures from operational cash flow. A high cash flow from operations to capital expenditures indicates "greater financial flexibility" and "a company that does not have to rely on external financing can take greater operating risks than one which would be forced to retrench if new capital suddenly became scarce or prohibitively expensive" (Fridson and Alvarez 2002).

Total free cash flow ratio [X51]
Price, Cameron et al. (2005) state that this ratio "portrays a hospital's ability not simply to survive but to thrive". In contrast to the previous ratios this ratio includes capital expenditures, because capital expenditures are necessary to continue to exist and to thrive in the long run. Drake (2007) indicates that because capital expenditures tend to be 'lumpy' (there are significant variations in capital expenditures from year to year), this ratio should be carefully analysed and be interpreted.

4.7.1 Comments

Cash flow ratios are a more reliable measure of any organisation's financial performance than net income because it is based on cash, not on an accrual basis of accounting.

4.7.2 Standards

A positive value of operating cash flow indicates a healthy organisation; otherwise a negative value indicates a cash flow problem. Hotel Mule (2010) state that "a mature, financially healthy company typically has a cash flow from operations to total liabilities ratio of 20 per cent or more". According to Price, Cameron, and Price a low value indicate that an organisation has less financial pliability.

4.8 Activity ratios

According to Neumann and Boles (1998) most managers find activity ratios, the most important ratios that can be influenced by managerial decisions. Activity ratios indicate how effectively a hospital used its invested assets. The higher the ratio the more revenue or efficient is an organisation with its assets (Vijn 2003: 74).
Other activity ratios that use items from the balance sheet and income statement are (average age of) plant ratios. These ratios give the best indication of the (average age of) plant for organisations that uses straight-line depreciation, because organisations use different depreciation methods. The activity ratios can be distinguished in:

- Total asset turnover [X52]
- Fixed asset turnover [X53]
- Current asset turnover [X54]

- Age of plant ratio [X55]
- Average remaining life [X56]
- Average total life span [X57]
- Age indicator [X58]
- Continuation ratio tangible fixed assets [X59]
- Accumulated depreciation percentage [X60]

Total asset turnover ratio [X52]

This ratio indicates the net sales divided by the average total assets. This ratio is a measure of an organisation's ability to generate sales from its total assets. The total asset turnover indicates euros generated by each euro spent on total assets. A higher ratio indicates a better turnover, but a comparison between organisations is only meaningful if the comparison is made in the same industry and in the same stage of the business cycle. Therefore, this ratio has a limited role for banks (Vos 2009: 151).

Fixed asset turnover [X53]

Mtetwa (2010) defines fixes assets as "assets that are used in production or supply of goods or services and they are to be used within the business for more than one financial year". The fixed assets are the long-term assets for a company to generate income. The fixed asset turnover measures how many times an organisation's fixed assets are used to generate revenue. A low value indicates "excessive investment in fixed assets, and indicates the insufficient utilisation of fixed assets"(Karanovic, Bogdan et al. 2009). The advantage of this ratio is that focus on capital expenditures which are a result of management decisions.

Current asset turnover [X54]

This ratio measures the efficiency with current assets. It indicates the revenue in euro generated per euro of current assets. A high current assets turnover ratio indicates that an organisation is efficient with their current assets. This ratio is the same as the fixed asset turnover, except that it focuses on the current assets.

Average age of plant [X55]

This ratio can be calculated by dividing the accumulated depreciation by depreciation expense. The average age of plant measures the age of organisation's physical facilities. This ratio also provides "insights into the future capital needs of the organisation" (Wareham and Majka 2003: 14). According to Governors State University (2004) "the older the average age of plant the greater the short term need for capital resources to replace its building and equipment". The average age depends on the component. For example, the equipment has a short useful life compared to the building.

Average remaining life [X56]

The assets of a hospital are recorded on the balance sheet on the basis of historical cost. The value of the assets on the balance sheet will be reduced by depreciation expense. The average remaining life is the net plant and equipment assets divided by the current year depreciation expense.

Average total life span [X57]

The average total life span is the average age plus the average remaining life. Also this ratio can be calculated by dividing the gross plant and equipment assets by the current year depreciation expense.

Age indicator [X58]

This ratio is the book value of the tangible fixed assets divided by the historical costs. A value of 0 per cent indicates that the tangible fixed assets are completely depreciated. A value of 100 per cent indicates that the book value is equal to the historical costs, this means that the assets are not depreciated and thus are new (Kesteloot and van Herck 2008: 168).

Continuation ratio tangible fixed assets [X59]
The continuation ratio indicates the relation between the investments in tangible fixed assets and the depreciation of fixed assets. A continuation ratio higher than 1.0 indicates that the investments in a book year are greater than the depreciation of tangible fixed assets (Kesteloot and van Herck 2008: 166). To ensure the continuation of tangible fixed assets it is important to achieve at least a continuation ratio of 1.0 time. The continuity ratio should be calculated over a longer period (e.g. 3 years), because most investment projects are implemented over a longer period.

If investments are more expensive (or cheaper) over the years, than is a continuation ratio of 1 too low (or too large) to guarantee the mere replacement of existing facilities. In addition, if a hospital invested for several years (too) little (and thus has a low depreciation value), a low amount of new investments is needed to achieve a continuation ratio 1.0 and vice versa. Finally, the continuation ratio should not only be calculated for the total tangible fixed assets but also for the underlying components of the tangible fixed assets (plant and buildings, medical equipment and so forth) (Kesteloot and van Herck 2008: 166).

Accumulated depreciation percentage [X60]
The accumulated depreciation percentage is defined as "as accumulated depreciation divided by gross property, plant and equipment, captures the age of physical facilities dimension" (Cleverley 2007). Thus this ratio indicates how much already has been expensed.

4.8.1 Comments

According to Clausen (2009) it is better to use the average total assets in a particular year, instead of the ending-year assets, because the total revenue is generated in that year. Therefore, the total average assets for a year should be used instead of ending-year total assets.

4.8.2 Standards

It is difficult to indicate whether an organisation is doing well from activity ratios. An organisation should be compared with historical values or industry averages. Therefore, it is important to determine the type of organisation, because an organisation's amount of fixed assets depends heavily on the type of industry an organisation competes on.

4.9 Other ratios

In this section the following other ratios are analysed:
- Occupancy ratio [X61]
- Average length of stay (1) [X62]
- Average length of stay (2) [X63]
- B-segment revenue to total revenues [X64]
- FTEs per bed [X65]
- Salaries to total expenses [X66]

Occupancy ratio [X61]
This ratio indicates the annual patient days by the number of available hospital beds multiplied by 365 days. In general, "the higher the occupancy rate, the better, unless it is so high that the hospital does not have the capacity to deal with emergency situations" (Gapenski 2009: 6).

Average length of stay [X62 and X63]
The average length of stay indicates the annual patient days by the total admissions, because hospitals are paid per admission, length of stay can affect a hospital's profitability. In general, a shorter length of stay means a greater profitability (Gapenski 2009: 7).

B-segment revenue to total revenues [X64]
This ratio measures the percentage B-segment revenues by the total revenues. In the B-segments hospitals can negotiate with health care insurers on the price for a treatment.

FTEs per bed [X65]
This ratio measures the total number of FTEs (full-time equivalents) divided by the number of beds. The FTEs converted part-time employees into full-time employees (Gapenski 2009: 8).

Salaries to total expenses [X66]
This ratio measures the average labour costs to total expenses, because labour is the largest expense in the provision of hospital activities. Thus, it is important to control the labour costs (Gapenski 2009: 11).

4.9.1 Comments

In general, the more efficient a hospital provided their services the higher the profitability. However, the average length of stay does not take into account differences in inpatient complexity. It is expected that hospitals with more complex care have a longer length of stay (Gapenski 2009: 7).

4.9.2 Standards

It is difficult to give standards for the other ratios. However, it is important to have the same level of other ratios as other hospitals that employ the same kind of activities.

4.10 Limitations of financial ratios

Financial ratios have a limited value in isolation of other aspects of an organisation, but in assessing the financial performance of an organisation in comparison with other organisations a financial ratio has a bigger value. On the other hand, financial ratios have the following limitations:

- First, it is important to analyse how financial ratios are calculated since, several accounting rules can be applied and influences the financial ratio. For example, the assets can be valued at market or historical value on an organisation's books.
- Second, single financial ratios focus on a certain aspect of organisation in isolation of other aspects. Therefore, it is also important to focus on the other aspects such as industry standards, economic conditions, historical values, and so forth. Also many aspects cannot be quantified through financial ratios such as, leadership, reputation and community support (Chabotar 1989: 191).

- Third, some organisations are conglomerates, thus difficult to compare when other organisations do not operate in the same line of business. Therefore it is important to analyse the kind of activities a hospital undertakes in the comparison of hospitals.
- Fourth, some unusual or transient events can affect the profit and the financial performance of a organisation and therefore manipulate a comparison between two or more organisations (Ross, Westerfield et al. 2008: 63).

However, a ratio can still give "a 'early warning signal' by highlighting aspects of an organisation's financial situation that merit further study and may require management action" (Chabotar 1989: 191-192).

4.11 Summary

Table 4.4 summarizes the key financial ratios to evaluate financial performance. The financial ratios are selected by the literature research and divided into categories according to their origin. The next chapter analyses the financial performance of Dutch hospitals in 2007 and 2008.

Table 4.4 The selected financial ratios.

	Financial ratios	Definition
	Liquidity	
	Static liquidity	
X1	Current ratio	current assets/ current liabilities
X2	Quick ratio	(current assets- inventory)/ current liabilities
X3	Cash ratio	cash/ current liabilities
X4	Net working capital ratio	(current assets - current liabilities)/ total assets
	Dynamic liquidity	
X5	Inventory and work in progress turnover	cost of goods sold/ inventory and work in progress
X6	Receivables turnover	sales/ accounts receivable
X7	Payable turnover	(total expenses - depreciation)/ current liabilities
X8	Days in inventory and work in progress	inventory and work in progress/ (cost of goods sold/ 365)
X9	Days in accounts receivable	accounts receivable/ (sales/ 365)
X10	Days in accounts payable	current liabilities/ ((total expenses- depreciation)/ 365)
X11	Operating cycle	days in accounts receivable + days in inventory - days in accounts payable
X12	Days cash on hand	(cash and short-term investments)/ ((total expenses - depreciation)/ 365)
	Leverage	
	Structural	
X13	Equity financing ratio	equity/ total assets
X14	Debt-to-equity ratio	total debt/ equity
X15	Debt-to-assets ratio	total liabilities/ total assets
X16	Capital case	capital case/ total assets
X17	Long-term debt to capitalization	long-term liabilities/ (long-term liabilities + equity)
X18	Long-term debt to equity	long-term liabilities/ equity
X19	Long-term debt to total assets	long-term liabilities/ total assets
X20	Fixed assets financing	long-term liabilities/ net fixed assets
X21	Budget ratio	equity/ total operating revenue
X22	RAC-ratio	collectively financed tied-up capital / Wtg-budget
	Coverage	
X23	Interest coverage ratio	EBIT/ interest expense
X24	Cash coverage	EBITDA/ interest expense
X25	Fixed charge coverage ratio	(EBIT + lease payments)/ (Interest charges+lease payments+sinking fund payments (1-Tax rate))
X26	Debt service coverage ratio	EBITDA/ (current portion of long-term debt + interest expense)
X27	Cash flow coverage	(EBITDA+ lease payments)/ ((interest expense + lease expense + principal repayments)(1-Tax rate))
X28	Cushion ratio	(cash + short-term investments)/ (debt principal payments + interest expense)
X29	Capital expense ratio	(interest expense + depreciation + amortization)/ total expense
	Profitability	
	Income statement	
X30	Gross profit margin	gross profit/ sales
X31	Operating profit margin	EBIT/ total operating revenue
X32	Net profit margin	net income after taxes/ total operating revenue
X33	Cash flow margin	EBIDA/ total revenues
X34	Free cash flow margin	(EBIDA- capital expenditures)/ total revenues
	Balance sheet	
X35	Return on assets	net income/ total assets
X36	Return on equity	net income/ equity
X37	Return on debt	net income/ debt
X38	Return on invested capital	(revenues and gain in excess of expenses and lossess + depreciation + interest)/ price-level adjusted total assets
X39	Return on capital employed	net income/ capital employed
X40	Basic earning power	EBIT/ total assets
X41	Return on net assets	net income/ (fixed assets + net working capital)
X42	Net debt to EBITDA	Net debt/ EBITDA

	Financial ratios	Definition
	Cash flow	
X43	Operating cash flow	cash flow from operating activities/ current liabilities
X44	Operating cash flow to long-term debt	cash flow from operating activities/ long-term debt
X45	Operating cash flow to total liabilities	cash flow from operating activities/ total liabilities
X46	Operating cash flow to total assets	cash flow from operating activities/ total assets
X47	Operating cash flow to sales ratio	cash flow from operating activities/ sales
X48	Operating cash flow to interest	cash flow from operating activities/ interest
X49	Operating cash flow to interest, lease and principal payments	cash flow from operating activities/ interest + lease + principal payments
X50	Operating cash flow to capital expenditures	cash flow from operating activities/ capital expenditures
X51	Total free cash flow ratio	free cash flow (operating cash flow - capital expenditures)/ operating cash flow
	Activity	
X52	Total asset turnover	total operating revenue/ total assets
X53	Fixed asset turnover	total operating revenue/ net fixed assets
X54	Current asset turnover	total operating revenue/ current assets
X55	Age of plant ratio	accumulated depreciation/ depreciation expense
X56	Average remaining life	net plant and equipment assets/ current year depreciation expense
X57	Average total life span	gross plant and equipment assets/ current year depreciation expense
X58	Age indicator	book value of the tangible fixed assets/ historical costs
X59	Continuation ratio tangible fixed assets	investments in tangible fixed assets/ depreciation of fixed assets
X60	Accumulated depreciation percentage	accumulated depreciation/ (gross property, plant, and equipment)
	Other	
	Utilization	
X61	Occupancy rate	average daily census/ number of staffed beds
X62	Average length of stay	total number of inpatient days/ total number of admissions
X63	Average length of stay	total number of inpatient days/ total number of admissions
	Revenue	
X64	B-segment revenue to total revenues	total B-segment revenue/ total revenues
	Costs	
X65	FTEs per bed	total FTEs/ occupied beds
X66	Salaries to total expenses	salary expense/ total expenses

5 Financial requirements

This chapter describes the financial requirement for hospitals set by banks and WfZ. In section 5.1, I will give an introduction about credit worthiness factors. In section 5.2, I will explain several financial ratios. This chapter gives an answer to research question three: Which financial ratios are actually used in practice?

5.1 Credit worthiness factors

It is necessary for health care organisations to make a business plan in order to acquire a loan from a bank or a guarantee of from the WfZ. The bank and the WfZ assess the credit worthiness of a hospital on the basis of the business plan. The credit worthiness of a hospital consists of two kinds of factors: qualitative factors and quantitative factors. The most important factors should be analysed to assess the credit worthiness of a hospital. The qualitative factors are the strategic choices a hospital makes and include business activities, market position, governance and management, size, the patient mix and so forth. Business activities include the type of health care a hospital delivers. The market position involves the degree to which a hospital controls the market region, especially in the B-segment. Governance and management involve the quality of the management. Staff motivation is about the motivation of the staff with regard to the investment. There are also numerous uncertainty pressures influencing the hospitals and influencing their access to capital. Examples of these pressures are demographic, technological and government regulation changes. Thus, it is obvious that capital needs should not be analysed in isolation or on an individual project basis.

This research focuses on the critical quantitative factors by means of financial ratios. But it is important to remember that qualitative factors affect the level of financial factors and also affect the requirements banks set to hospitals in order to acquire a loan.

5.2 Financial ratios

Banks analyse the financial performance of a hospital, both in the past, and conjecturally, in the future. In this way they try to determine whether a hospital can borrow additional debt. Banks utilize financial ratios to monitor the financial performance of a hospital. Financial ratios are useful ratios of a hospital's financial performance. The interviews gave insight into the most important financial ratios. In this section I will discuss the most important financial ratios. In this research I identified four financial characteristics: (1) leverage, (2) profitability, (3) liquidity and (4) collateral. The list of persons interviewed is presented in Appendix IV.

5.2.1 Leverage

The respondents use leverage ratios for monitoring business performance. The respondents use leverage ratios and regard the equity-to-assets ratio as applicable. The respondents regard the DSCR as highly applicable.

Structural

The equity-to-assets ratio measures the amount of equity in relation to the total assets. Lenders require that there is enough equity capital in an organisation to absorb potential losses. Thus, lenders prefer a high equity-to-assets

ratio. In the short term, banks expect an equity-assets ratio not to be less than ten to fifteen per cent. In the long term banks expect a hospital to let the equity-assets ratio increase, to twenty-five per cent. Therefore, hospitals need to achieve a positive net profit margin of at least one per cent. The present and future increase in financial risks by the change in regulations and the credit crisis require a stronger capital position of hospitals: "a high debt-to-equity ratio would have more risk of insolvency than an organisation that was financed entirely through equity capital (Chabotar: 189)" A financial institution can include the equity-to-assets ratio in a debt covenant. The key issue is to analyse the organisation at the group level as a legal entity and analyse whether the organisation holds sufficient equity capital to absorb potential risks.
Banks also analyse the absolute amount of equity capital. After all, an equity-to-assets ratio of ten per cent for a small hospital is, in absolute terms, a less considerable buffer capacity than the same percentage for a large hospital. Finally, when calculating the equity-to-assets ratio a financial institution modifies the total assets by excluding assets that have no or little (market) value for the lender. Hospitals need to do an impairment test to analyse whether the realizable value is less than the book value. It is expected that future depreciations will not be recovered, this means devaluation of a hospital fixed asset. This devaluation affects the equity capital of a hospital.

Coverage
The debt service coverage ratio measures the ability of the hospital to repay the principal and interest on the loan. This ratio is useful to a bank in assessing the credit worthiness of a hospital. A DSCR higher than 1.0 per cent indicates there is enough available cash flow to meet annual interest and principal payments on debt. The DSCR is the main driver for financial institutions to assess credit worthiness of hospitals. Banks prefer that hospitals maintain a DSCR of 1.2 to 1.3 times. But during the first two years of the debt covenant, banks allow values not to be less than 1.0 to 1.1 times. The business plan must mainly show the eligibility of the project in the first five to ten years after the investment. Frequently, this period is the most critical period because of the so-called 'bath-tub' (expenditures are larger than income) after the investment. It is usual to make agreements in the debt covenant about the minimum value of the DSCR. For a bank it is important that there is enough cash flow available to service debt obligations. A decline in DSCR often gives a signal to the bank that a hospital has financial problems. Also this provides an incentive for management to sort out the problem and improve the ratio, in order to stay in a stable financial position. The disadvantages of financial plans are that they often are accounting-based, and therefore, subjected to the disadvantages inherent in accounting measures. Therefore banks use the cash flow and cash flow related ratios, for example the DSCR. For example, hospitals can have substantial accounting profits without having a good operating cash flow. The changes in the system have introduced an interest rate risk for hospitals. By means of interest rate derivates the risk of high interest rates can be controlled. According to the respondents extensive variations among different financial ratios appear to offer little additional insights, because the DSCR in particular already contains a lot of information.

Lifetime
In an ideal situation, the duration of the loan is equal to the technical lifetime of a hospital building. In the past, this was not a problem because of hospital buildings were written off linearly. During this period a hospital received the capital costs from the NZa. The fixed assets of hospitals had long depreciable lives (forty to fifty years) and the technical and economical lifetime was equal.
However, with the changes in regulation the technical lifetime of a hospital building remains probably forty to fifty years but the economic lifetime decrease to just twenty-five or thirty years. Banks want to reduce their risks and require a shorter economic lifetime and obviously prefer short-term loans rather than long-term loans. For banks also the future is uncertain, and it is difficult to predict what the financial situation of hospitals will be in the future.
This may affect a hospital in the following ways (Bellers 2010):

- The decrease in the economic lifetime can result in increased debt obligations. This can lead to pressure on the income to fulfil debt obligations.

- The loan is provided by the bank for a period of fifteen years, with linear depreciation based on thirty years. As a result, there are refinancing risks, the hospital must make a large repayment after fifteen years (half of the principal) and the WfZ guarantee is complicated by the repayment process.
- Banks require a higher interest rate on loans, because the financial risks to banks are larger than they were before.

Moreover, the requirements set by Basel III for banks may affect the financing and the interest that hospitals pay.

5.2.2 Profitability

The respondents use profitability ratios for monitoring business performance. The respondents use profitability ratios but regard the return on equity as less applicable. The respondents regard the return on assets as highly applicable.

Profit margin
The profitability of a hospital should be carefully analysed, because the net profit margin is influenced by incidental operations (for example, extraordinary income and costs). The operating profit margin gives a better assessment of the financial performance of a hospital. Industry standards are important when analysing the profit margin. Low profit margins may indicate some problems. Lenders impose minimum profit margin requirements to ensure that the borrower generate enough money to fulfil debt obligations. The minimum required net profit margin is 1.0 per cent. In the past, hospitals had difficulties with generating profit from their daily operational activities. To reach the minimum net profit margin requirement hospitals have to operate more efficiently to generate higher profit margins than in the past. For example, a better operational efficiency in terms of FTE per bed can lead to lower operational costs. Also financial institutions want to know how the profit margin will be improved by the board of a hospital.

In investment decisions the focus is primarily on future cash flows and ratios that incorporate cash flow. It is difficult to estimate future cash flows. The determination of the revenues includes also the relationship with the health insurers. The future revenues are difficult to estimate since it is not possible to sign a long-term contract with a health insurer. Since the building and maintenance costs are constant banks, a health care provider who wants to reduce costs will economize on personnel costs. Personnel costs are approximately sixty per cent of the total costs of a hospital. Thus, personnel costs have a significant impact on the net income and therefore should be studied carefully.

In the past, hospitals tended to perform all the services themselves. According to banks, hospitals should make clear choices as to which (profitable) activities they do or do not engage in. They should decide in which activities want to compete with other hospital, and in which activities they want to work together with other hospitals.
Hospitals have no shareholders who must be paid part of the net profit. Therefore, considering the return on equity is less important for hospitals.

5.2.3 Liquidity

The respondents regard static liquidity ratios as less applicable for monitoring the performance of hospitals.

Static liquidity
The current ratio measures the current assets in relation to the current liabilities. This ratio indicates or the borrower has enough liquidity to pay the lender. Borrower will maintain a current ratio of 1.0 time.

The golden balance-sheet rule indicates that long-term assets need to be financed by long-term liabilities and equity and short-term liabilities are needed to finance short-term assets. The matching of assets and liabilities protects the hospitals against fluctuations in the interest rate. Nowadays, some hospitals have financed their assets with short-term debt, because the short-term interest rate is always lower than the long-term interest rate. Banks recommend that hospitals do not speculate with the interest ratio, and that they make a provision (for example, credit account by bank or health insurer) in case the health insurer wants the advance on the payment back.

Most hospitals have large repayment obligations to health care insurers. The recovery of these amounts has implications for the hospitals. Banks indicate that they are reluctant to provide significant finance for working capital.

Dynamic liquidity
Hospitals have a relatively high number of days in accounts receivable compared to other industries because of the situation with health insurers. This has to do with uncertainty about offset fees. Also a hospital will be paid by a health insurer if the DBC is closed. The average duration of a DBC is approximately ninety days. Thus it takes a long time to collect the payments from the health insurers. Hospitals will have to finance these incurred costs.

The respondents mention a minimum of ninety accounts in receivables days for hospitals. The problem is not that health insurers are not "good debtors", a high number days in accounts receivable costs the hospital money, because a hospital must hold a credit facility with a bank or health insurer. Thus, hospitals need to collect the payments from their customers in good time, so they will have no problems in paying their debts.

5.2.4 Collateral

The credit risk of a bank is a conditional risk. It only occurs when the banks sell the collateral provided as security. The following securities can be distinguished for a bank:

- DSCR
- WfZ and Go Cure
- Fixed assets
- Mortgage registration

<u>DSCR</u>
First of all, the DSCR is important, because the DSCR measures whether an organisation has enough EBITDA to pay debt obligations (repayment and interest).

<u>WfZ and Go Cure</u>
Hospitals can get an interest benefit on their loan by the WfZ-guarantee and the Guarantee Business Financing Curative Health Care (in Dutch: Garantie ondernemingsfinanciering curatieve zorg, Go cure). The Go Cure is available for investments up to fifty million euro and guarantees 50 per cent of a new bank loan. WfZ-guarantees can in principle also be given in the case of larger investments.
It can no longer be taken for granted that the Guarantee Fund for the Health Care Sector (WfZ) will guarantee the entire loan. This will be assessed in the context of the financial situation, the entire organisation and the nature and scope of the investment. The possibility of a guarantee on the entire loan is no longer open. That increases the risk profile of a hospital. Also banks limit the size of their loans to hospitals. For investments above 125 to 150 million euro, banks generally prefer to provide financing with several banks in a consortium.

Fixed assets

Banks do not want their hospitals to be in default. Normally, in case of default, the fixed assets cannot be sold for market value by liquidation of the hospital. Also, hospital buildings are very specific buildings, and they have relatively little alternative use possibilities. Hospitals should consider alternative future uses of their building. These considerations will influence the market value of a hospital building.

Another aspect is that banks do not want to have it on their conscience to let a hospital go bankrupt. That could damage the image of a bank. Therefore, lenders tend to take a pessimistic view and require assurances that a hospital can pay the debt and interest.

An important financial ratio is the Loan-to-Value (LTV-ratio). This ratio indicates the difference between the value of the loan and the value of the collateral. Usually it is expected that the LTV will be reduced during the time of the loan. The LTV is reduced because of repayments on the loan. The decline in LTV means an increase in security for a bank (Art Branch Inc. 2011).

Mortgage registration

The financial and the WfZ institution ask for a mortgage registration. They do this to make sure that, if for instance the interest and debt payments are not paid, they will be able to sell the building to recover the money lent. The mortgage registration gives lenders a stronger legal position in comparison with other creditors. In the past, this was 'unthinkable' for a hospital.

Summary

Banks assess the profitability, liquidity and leverage of a hospital. On the other hand, they also assess the theory behind the numbers, the business activities, market position, government and management and so forth. The DSCR is the ratio that is used most by lenders to assess the repayment capabilities of a hospital. A DSCR of 1.0 means that all operational income is spent on principal repayment and interest payments. The equity-to-assets ratio is a good ratio for assessing the financial health of a hospital. Banks require a DSCR greater than 1.2 and an equity-to-assets ratio greater than ten to fifteen per cent.

6 Data analysis

In this chapter the financial performance of Dutch hospitals is analysed. In section 6.1, an introduction about the data analysis will be given. In section 6.2, the financial situation of Dutch hospitals will be analysed. This section answers research question four: What is the financial performance of Dutch general hospitals? In section 6.3, ANOVA will be used to detect differences between Dutch hospitals. This section gives an answer to research question five: What are the differences in financial performance between different groups of hospitals?

6.1 Introduction

Data collection

The annual reports are obtained from the website www.jaarverslagenzorg.nl. This website is maintained by the Central Information Unit on Health (in Dutch: Centraal Informatiepunt Beroepen Gezonheidszorg, CIBG). The publication of the digital annual reports is based on the duty of health care institutions (in Dutch: deponeringsplicht), as is set. Hospitals are required to have annual financial audits. Appendix V provides a list of the hospitals which are studied. The annual statement of 82 hospitals are analysed of the total of 85 Dutch hospitals. The annual reports of 2007 and 2008 are analysed.

Variables analysed

In this research 66 ratios are included. These ratios are listed in Table 4.4. The ratios are divided into six categories: liquidity ratios, leverage ratios, profitability ratios, operating cash flow ratios, activity ratios and other ratios. This research includes a limit number of nonfinancial ratios, because the limited availability of nonfinancial data in the database. This research presents how financial ratios are distributed. The lowest and highest values of the ratios are shown to highlight differences in scores between hospitals. The variance and the standard deviation are also calculated. Besides this, the mean, median and standard deviation are analysed. This level of analysis provides better data for comparison of hospitals. According to Beaver (1968) "differences in means are difficult to interpret without additional knowledge about the ratio distribution".

Limitations of the research

This research analyse the financial performance of hospitals on the basis of the financial statement. But some hospitals also operate also operate nursing and retirement homes, dialysis centres, neighbourhood health centres, surgical centres and other health and non-health related business. At the same time some hospitals have no value of a given item on the financial statement in the data set. Thus, it is not possible to calculate the related financial ratio. These ratios are included in the table, but logically missing values. Finally, the data set is analysed on values that are theoretically impossible or practical unusual.

6.2 Results of Dutch hospitals

Descriptive analysis

In the following sections the financial performance of Dutch hospitals will be analysed on the basis of liquidity ratios, leverage ratios, profitability ratios, operating cash flow ratios, activity ratios and other ratios.

6.2.1 Liquidity ratios

The current ratio indicates the number of times an organisation can repay short-term obligations with its short-term assets. Table 6.1 give the results of the liquidity analysis for Dutch hospitals.

Table 6.1 Liquidity ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 N = 82					Dutch hospitals in 2007 N = 82		
	Liquidity	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
	Static liquidity								
X1	Current ratio	0.68	0.67	0.21	0.24	1.67	0.70	0.69	0.20
X2	Quick ratio	0.65	0.65	0.20	0.23	1.61	0.67	0.66	0.19
X3	Cash ratio	0.08	0.02	0.13	0.00	0.71	0.08	0.02	0.11
X4	Net working capital ratio	-0.17	-0.16	0.12	-0.68	0.15	-0.16	-0.15	0.12
	Dynamic liquidity								
X5	Inventory and work in progress turnover	31.06	11.28	46.24	3.75	281.35	24.66	10.77	42.11
X6	Receivables turnover	6.82	4.38	15.53	1.96	142.13	5.75	4.15	8.02
X7	Payable turnover	1.69	1.60	0.50	0.51	3.30	1.70	1.63	0.52
X8	Days in inventory and work in progress	34.65	32.53	25.32	1.30	97.29	39.60	33.91	27.54
X9	Days in accounts receivable	87.37	83.30	36.04	2.57	185.81	86.46	87.93	29.97
X10	Days in accounts payable	235.95	228.30	83.30	110.65	717.42	238.09	224.39	90.39
X11	Operating cycle	-113.93	-98.11	71.79	-569.13	-10.92	-112.03	-101.15	79.15
X12	Days cash on hand	17.01	4.04	27.41	0.00	107.53	17.23	4.51	27.85

Static liquidity

Table 6.1 indicates most hospitals actually have a current ratio less than 1.0 in 2008. The results in table 6.1 show that the average current ratio of hospital is 0.68 in 2008. This is a decrease in current ratio of 3.14 per cent, compared with 2007 when the current ratio was 0.70. The liquidity ratios have a high standard deviation meaning that there are significant variations in liquidity between hospitals. This is mainly because of the ups and downs between the hospitals.

It was concluded in the literature research that a hospital is demonstrating good financial management if the current ratio is between 1.0 and 2.0 times (Pink et al 2005). Table 6.1 shows, on average Dutch hospitals were below the benchmark in 2008. A total of 79 hospitals had a current ratio less than 1.0 (96% of the total number of hospitals). Although the current ratio is below 1.0, hospitals on average can still meet debt obligations.

Also the quick ratio, on average 0.65 is below the 1.0 norm. The quick ratio is not much lower than the current ratio. This means current assets are not highly dependent on inventory. This suggests that inventories are not a major component of the current assets and the current assets are highly liquid. The cash ratio of 0.05 indicates hospitals have a little amount cash in hand compared to its current liabilities. Hospitals have the most of the current assets in accounts receivable and accrued income (approximately twenty per cent) and work in progress on account of DBC's (approximately seven per cent).

The on average negative net working capital ratio of -0.17 indicates the current liabilities exceed the current assets. This may indicate that hospitals have difficulties to finance their daily operations. The negative working capital must be financed with cash and short-term loans from banks. Most hospitals fund daily operations by credit provided by health insurers or banks.

The negative net working capital ratio indicates that on average Dutch hospitals are technically insolvent, because the current liabilities are greater than the current assets. The negative net working capital ratio also means that a part of the fixed assets are financed with short-term liabilities. This is further explained in the remainder of this research.

Dynamic liquidity

An average amount of 87.37 days in accounts receivable means that it takes time to collect payments from health insurers. In 2008 the days in accounts receivable is not much different than in 2007. The average days account receivable is above the standard of 90 days. Thirty two hospitals are above the standard of 90 days. For hospitals it is important to improve the average days in accounts receivable. The low liquidity is mainly due to the late closure of DBC's and late invoice. Hospitals are paid after the closing of a DBC. On the other hand, hospitals have already made costs. The inventory and work in progress turnover is 31.06 times, meaning that on average inventory stays 34.65 days in the operation.

The minimum and maximum operating cycle of -569.13 and -10.92 are translated into 569 days and 11 days. The negative operating cycle indicates hospitals received cash from revenues before they must pay their suppliers. The main reasons for the negative operating cycle are the large payable balances that hospitals had on the balance sheet in relation to the costs. This is mainly because of the advance made by health insurers. The operating cycle is in 2008 and 2007 nearly the same. There are many hospitals with significant repayment obligations to health insurers. In the short-term, large amounts must be repaid to the health insurers. This could have an substantial impact on the financial position of hospitals.

6.2.2 Leverage ratios

Table 6.2 gives the leverage ratios of Dutch hospitals in 2008. Sixteen leverage ratios are calculated and will be analysed.

Table 6.2 Leverage ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 *N = 82*					Dutch hospitals in 2007 *N = 82*		
	Leverage	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
	Structural								
X13	Equity financing ratio	10.55	10.22	7.30	-40.26	24.87	10.20	9.57	4.71
X14	Debt-to-equity ratio	717.31	697.87	615.24	-3252.81	2754.92	778.32	792.57	1009.84
X15	Debt-to-assets ratio	75.12	75.85	13.43	40.84	131.41	77.51	76.83	11.25
X16	Capital case*								
X17	Long-term debt to capitalization	78.14	76.78	27.06	34.31	298.46	77.61	78.38	12.08
X18	Long-term debt to equity	356.52	319.93	306.24	-1351.96	1433.98	382.26	337.84	527.72
X19	Long-term debt to total assets	37.23	38.03	11.93	4.05	61.99	38.60	39.17	12.41
X20	Fixed assets financing	55.00	56.43	14.79	6.85	84.41	57.45	59.67	15.88
X21	Budget ratio	12.12	11.92	7.57	-35.37	35.11	11.75	11.48	5.45
X22	RAC-ratio	14.36	13.82	10.73	-47.13	48.42	11.80	11.07	6.97
	Coverage								
X23	Interest coverage ratio	1.48	1.34	1.84	-9.81	12.19	1.42	1.24	1.38
X24	Cash coverage	5.03	4.24	5.39	-7.05	50.07	4.85	4.41	3.22
X25	Fixed charge coverage ratio	-18.86	5.24	147.39	-1167.90	19.92	3.94	3.73	1.64
X26	Debt service coverage ratio	1.72	1.67	0.91	-4.80	3.88	1.66	1.63	0.56
X27	Cash flow (fixed charge) coverage	1.64	1.65	0.82	-4.38	3.56	1.59	1.58	0.49
X28	Cushion ratio	0.79	0.16	1.42	0.00	7.76	0.71	0.16	1.38
X29	Capital expense ratio	10.79	10.59	2.46	5.37	18.51	11.06	10.70	2.49

* It is not possible to calculate this ratio for 2008 and 2007.

Structural

Table 6.2 shows that, on average, the equity to total assets ratio of hospitals was 10.55 per cent. Significant differences were found between the mean values of the leverage ratios. Two hospitals had a negative equity financing ratio. With this small proportion of equity creditors would probably be somewhat cautious about lending funds to hospitals.

The equity financing ratio had increased by 3.42 per cent in 2008. The increase is because of accounting rules and is caused by the shift of the equalisation reserves (in Dutch: egalisatierekening reserves) to equity capital. If the depreciation reserve conservation investment has excluded, the equity increased a smaller proportion. Thus, the increase in equity financing ratio is mainly caused by differences in accounting practices. The equity, on average, consists of 5 per cent of capital and 84 per cent of collectively financed tied-up capital (in Dutch: collectief gefinancierd gebonden vermogen) and 11 per cent of non-collectively financed tied-up capital (in Dutch: niet-collectief gefinancierd gebonden vermogen).

The budget ratio average improved from 11.75 per cent in 2007 to 12.12 per cent in 2008. The higher the ratio, the greater the financial buffer in a hospital. In the past, many hospitals increased their equity to the maximum level allowed by the government and use long-term debt as the main financing source for new capital investments.

The debt-to-equity ratio indicates that the majority of assets are financed by debt and hospitals are highly-debt leveraged. On average, the total assets of hospitals are greater than the total liabilities. This means that on average hospitals are not legally insolvent. In 2008 two hospitals were legally insolvent.

The long-term debt to capitalisation, equity and total assets ratios show that hospitals are less equity financed. In addition to this, some hospitals had primarily financed fixed assets with short-term liabilities and not, as is usual with long-term liabilities. These aspects can lead to difficulties with attracting new long-term debt financing.

Thirty-seven hospitals had an equity financing ratio below the minimum standard of 10.0 per cent, as indicated by the banks. Sixty-eight hospitals perform under the standard of 15.0 per cent (83 per cent of all Dutch hospitals). Low leverage ratios may be limited hospitals access to attract capital because of their limited resistance. In general, hospitals with a greater equity financing ratio are riskier than hospitals with a ratio.

Some hospitals make in their annual report a provision for impairment, because the fixed assets (hospital building) are maybe not recoverable from the future production. If the result from an impairment test is a loss, the loss should be written-down as a loss. These 'potential' losses can have substantial impact on the equity capital of hospitals.

In 2008, for most hospitals the ROIC is larger than the WACC. In future, hospitals' margin will be come under pressure; therefore an increase in margins is desirable.

Coverage

The times interest earned ratio measures the relationship between the hospital's incomes to its debt obligations. In 2008, on average had hospitals a times interest earned ratio of 1.48 times. While fifteen (18 per cent) hospitals had a times interest earned ratio lower than 1.00 times.

In average hospitals are in a position to cover interest and principal payments as indicated by the times interest earned and debt service coverage ratio. But lenders analyse the historical, present and future ability to meet its financial obligations. Thus, lenders also view the future coverage ratios.

The capital expense ratio measures the percentage capital by total costs. This gives an indication of the amount of capital costs. On average the capital costs are 10.79 per cent.

A high debt ratio does not make a hospital insolvent as long as the hospital's income is enough to cover interest and principal payments. But hospitals had small values of profitability ratios in 2008. This can lead to difficulties if hospitals attempt to attract additional long-term debt.

In 2008, the DSCR is above the minimum standard of 1.2 times. If the probability of future shorter repayment periods and increases in interest rates are taken into account than the DSCR is relative small. Therefore, is desirable, an increase of the DSCR.

6.2.3 Profitability ratios

To determine the profitability of hospitals profitability ratios are calculated. Table 6.3 show the profitability of Dutch hospitals.

Table 6.3 Profitability ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 N = 82					Dutch hospitals in 2007 N = 82		
	Profitability	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
	Income statement								
X30	Gross profit margin*								
X31	Operating profit margin	3.45	3.48	4.24	-30.84	9.71	3.56	3.39	2.71
X32	Net profit margin	1.00	1.13	4.19	-33.98	6.34	0.88	1.03	2.69
X33	Cash flow margin	11.11	11.04	4.51	-22.16	19.71	11.44	10.73	3.19
X34	Free cash flow margin	-3.06	-0.30	10.29	-38.45	11.33	-5.93	-3.11	12.62
	Balance sheet								
X35	Return on assets	0.79	1.15	4.58	-38.68	4.23	0.68	0.95	2.45
X36	Return on equity	10.69	9.69	18.23	-75.51	96.07	5.57	9.64	32.95
X37	Return on debt	1.41	1.61	4.89	-38.90	7.24	0.98	1.21	3.76
X38	Return on invested capital*								
X39	Return on capital employed	7.56	7.87	4.45	-28.80	15.47	7.58	7.58	2.82
X40	Basic earning power	2.87	3.09	4.46	-35.10	6.55	2.94	2.94	2.16
X41	Return on net assets	2.49	2.30	11.65	-84.62	54.56	2.64	1.76	12.18
X42	Net debt to EBITDA	8.33	8.18	2.44	-4.23	13.90	9.08	8.78	2.88

* It is not possible to calculate this ratio for 2008 and 2007.

Income statement

The net profit margin measures the revenues divided by the expenses. Table 6.3 shows, on average, hospitals had a net profit margin of 1.0 per cent. Seven hospitals had a negative net profit margin. In total, hospitals are realizing revenue of €11,636,564,154 in 2008. The EBIT and net income are, respectively: €397,760,318 and €131,226,146. In 2007, hospitals realized revenue of €10,926,136,037. It is the question whether the expenditures increased faster than the inflation, whether revenues increased due demographic reasons and whether the increase is larger than the GDP growth.

It was concluded that a 'good' net profit margin should be above 1.0 per cent. Forty-five hospitals (55 per cent of the hospitals) have performed above the standard but also this means that a significant part of the hospitals have performed below the standard. The majority of hospitals had a net profit margin between 0.0 per cent and 3.0 per cent (76 per cent of the hospitals). The hospital with a net profit margin of -33.98 per cent is the IJsselmeer hospitals. Without this hospital the average net profit margin is 1.43 per cent. Hospitals are non-profit organisations so a high value was not expected. Note, that the net profit margin is affected by occasional ex-post reimbursement. This distorts the operating profit margin when analysing the financial performance of hospitals. Therefore, it is important to analyse the operating profit margin. The operating profit margin is 3.45 per cent; this means that hospitals are realizing €0.03 income for every euro of goods sold. This is a small margin, especially since the primary way to increase the amount of equity capital is by earning and retaining profit. There are improvements necessary to achieve positive operating results in order to increase the equity base.

Eight hospitals (10 per cent) had a negative operating profit margin and one hospital (1.0 per cent) had a negative net profit margin for 2008. The comparison of hospitals based on profitability may be misleading, because hospitals differ in specialisation. For example, some hospitals employ residential care.

Hospitals generate on average 11.11 per cent cash flow margin. The cash flow margin has not seen a considerable change in 2008.

The operating profit margin and cash flow margin for most hospitals were lower in 2008 than in 2007. Only the net profit margin was greater in 2008 than in 2007. However, the net profit margin is affected by occasional ex-post reimbursement.

Another aspect to take into account should be that, in the future Dutch hospitals could be discounted by the Dutch government. This leads to smaller profit margins and lower profitability ratios.

Balance sheet
The assets of a hospital are used to generate profits. Hospitals have, on average, a return on assets of 0.79 per cent. The maximum value was found to be 6.55 per cent in 2008. The average return on assets indicates hospitals were able to generate € 0.79 cents of profit for every euro of assets. In 2008, there was a minimum change in the return on assets.

The return on assets is affected by the average age of plant. Since, the asset values on the balance sheet are on the basis of historical costs. Hospitals that purchase assets earlier have lower asset values. The inflation also affects the return on assets because the annual depreciation remains at historical value, thus do not indicate present values. Thus, the return on assets is distorted, because it compares historical values and present values.

The basic earning power was with 2.87 per cent in 2008 slightly lower in comparison with 2.94 per cent in 2007. This ratio measures the earning power of assets excluded taxes and leverage effects. Therefore, this ratio is useful to compare hospitals with different taxes and financial leverage structures. The large difference between the basic earning power and the return on assets are mainly because of interest payments. Hospitals use large proportions of debt and thus have higher interest expenses.

Another ratio for assessing the efficiency of a hospital is the return on capital employed. A general rule is that "the return on capital employed should always be higher than the rate at which a company borrows" (Investopia 2011b). On average the 7.56 per cent, this is above the interest rate of long-term debt. The return on capital employed is not drastically different between the years 2008 and 2007.

The return on equity implies capital structure decisions. The more debt an organisation has, the higher the return on equity is likely to be. Table 6.3, shows the operating result as a percentage of the total equity. The return on equity improved, on average, from 5.57 per cent in 2007 to 10.69 per cent in 2008. This show that, hospitals are heavily dependent on debt based finance, since hospitals do not have access to the equity capital market.

A disadvantage of the return on assets, return on equity and related ratios is that they do not take into account the risk taken, or the opportunity cost of capital.

6.2.4 Operating cash flow ratios

These ratios use the cash flow instead of the net income, because cash is the most liquid form of assets. The operating cash flow to sales indicates how efficient hospitals convert their sales into cash. The higher the

operating cash flow to sales is the more cash is available from revenues. Negative operating cash flows mean that hospitals are losing money. Thus, hospitals need to attract additional capital to finance their operations.

In 2008, the cash flow from investing activities is greater than the cash flow from operating activities for most hospitals. The investments were financed with short-term debt and equity, but also with new long-term loans.
Cash flow ratios are a more reliable measure of any organisation's financial performance than net income because it is based on cash, not on accrual basis accounting. However, cash flow ratios are not future analysed, because it is not possible to correctly determine the operational cash flow from the data set, because many data set errors (for example, missing data). Therefore, the values in table 6.4 must be viewed with caution. This is the main reason to give no conclusion on the values in table 6.4.

Table 6.4 Operating cash flow ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 *N = 82*					Dutch hospitals in 2007 *N = 82*		
	Cash flow	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
X43	Operating cash flow*	0.38	0.32	0.44	-0.42	2.79			
X44	Operating cash flow to long-term debt*	33.26	26.21	43.08	-113.61	240.90			
X45	Operating cash flow to total liabilities*	20.87	18.44	21.51	-14.55	94.96			
X46	Operating cash flow to total assets*	10.91	10.73	10.21	-16.22	37.56			
X47	Operating cash flow to sales ratio*	12.33	12.32	11.02	-14.25	45.02			
X48	Operating cash flow to interest*	5.41	4.65	5.63	-4.53	24.32			
X49	Operating cash flow to interest, lease and principal payments*	1.81	1.60	1.91	-2.87	8.56			
X50	Operating cash flow to capital expenditures*	1.21	0.89	1.61	-1.80	8.90			
X51	Total free cash flow ratio**								

* It is not possible to calculate this ratio for 2007.

** It is not possible to calculate this ratio for 2008 and 2007.

6.2.5 Activity ratios

Hospitals had, on average, a total asset turnover ratio of 0.90 times. Whereby, on average, hospitals had a fixed asset turnover ratio of 1.38 times. Thus, for every euro of net fixed assets €1.38 cents in revenue were generated. Table 6.5 shows that hospitals need large investments to generate revenue. Otherwise, this may be suggested that hospitals are not using their assets efficiently. It is important to use fixed assets as efficiently as possible.

Table 6.5 Activity ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 *N = 82*					Dutch hospitals in 2007 *N = 82*		
	Activity	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
X52	Total asset turnover	0.90	0.92	0.18	0.52	1.35	0.89	0.89	0.19
X53	Fixed asset turnover	1.38	1.35	0.39	0.66	2.64	1.36	1.28	0.40
X54	Current asset turnover	2.86	2.80	1.09	0.59	7.08	2.68	2.56	0.90
X55	Age of plant ratio*								
X56	Average remaining life	9.97	10.06	2.40	4.68	17.42	9.45	9.33	2.13
X57	Average total life span*								
X58	Age indicator*								
X59	Continuation ratio tangible fixed assets	1.87	1.41	1.30	0.36	7.66	2.32	1.85	1.61
X60	Accumulated depreciation percentage*								

* It is not possible to calculate this ratio for 2008 and 2007.

There is a small improvement in the use of total assets and fixed compared with the total asset turnover in 2007. The total asset turnover is not constant for all hospitals. There are large variations in asset turnover. Mainly

because of, the fixed assets are shown on the balance sheet on the basis of historical costs, less depreciation. The fixed asset turnover was low because of high capital investments are needed.

The average current assets turnover increase from 2.68 times in 2007 to 2.86 times in 2008. This means that hospitals using their current assets more efficiently.

6.2.6 Other ratios

The other ratios give an indication of the utilisation, revenues and costs of hospitals.

Table 6.6 Other ratios of Dutch hospitals in 2008 and 2007.

	Financial ratios	Dutch hospitals in 2008 *N = 82*					Dutch hospitals in 2007 *N = 82*		
	Other	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
	Utilization								
X61	Occupancy rate *	77.69	79.03	9.89	51.60	97.19			
X62	Average length of stay *	5.72	5.75	0.53	3.29	6.68			
X63	Average length of stay *	2.91	2.97	0.33	2.07	3.61			
	Revenue								
X64	B-segment revenue to total revenues	18.38	18.93	4.85	0.00	26.89	8.24	8.12	2.33
	Costs								
X65	FTEs per bed	3.19	3.27	0.75	0.00	4.55			
X66	Salaries to total expenses	59.67	59.61	4.00	50.35	73.91	59.35	59.17	3.98

* It is not possible to calculate this ratio for 2007.

Utilisation

Table 6.6 show the average occupancy rate was 77.69 per cent in 2008. Twenty-three hospitals have a ratio below 70 per cent. The average length of stay (1) is, on average, 5.72 days. The hospitals showed an average length of stay (2) of 2.91 days. Reduction of the average length of stay is important to make better use of the available hospital capacity. A shorter average length of stay can indicate a more efficient hospital. However, when the average length of stay is analysed into account should be taken differences between hospitals in activities.

Revenue

The B-segment revenue is above the 2007 percentage of 8.24 per cent. This is caused by the expansion of the B-segment by January 1, 2008 and the inclusion of the cost of capital component in the B-segment. The extension of the B-segment is accompanied by a decrease in the Health Care Tariffs Act Budget. There can be greater financial risks for hospitals that are highly dependent on the B-segment revenues and do not have a strong competitive position.

Costs

Table 6.6 show hospitals wage and salary expenditures tot total expenses. It shows that 59.67 per cent of hospital expenditure was spent on wages and salaries. So, a large proportion of the expenditure was spent on salaries. There is a hospital that spends about 74 per cent of the costs to personnel costs. The increase of the personnel costs is mainly, because of a rise in collective labour agreement levels.

6.3 ANOVA

One Way Analysis of Variance (ANOVA) is conducted to analyse whether there are significant differences between different categories of hospitals for each financial ratio. Therefore, this section gives an answer to research question five: What are the differences in financial performance between different groups of hospitals?

With thirteen financial ratios is the financial situation of hospitals is analysed. The selected ratios are divided into five categories: liquidity ratios, leverage ratios, profitability ratios, activity ratios and other ratios. ANOVA was applied, because this research involved a comparison of two and more categories.
In an attempt to generalize this research hospitals were subdivided into four groups for a further comparison. The purpose of the ANOVA is to analyse significant difference in the financial situation of these groups of hospitals. This research divides hospitals by type, activities, Randstad and revenue, see table 6.7. The IJsselmeer hospitals are not part of the ANOVA test, because this hospital has a substantial negative result and negative equity capital and therefore influences significantly the results.

Table 6.7 Liquidity Dutch Hospitals N=81.

	Hospital data sets	
1. Type	*Number*	*Per cent*
General	56	69%
Top-clinical	25	31%
2. Activities		
Mixed hospitals	14	17%
Other hospitals	67	83%
3. Randstad		
Randstad	42	52%
Outside the Randstad	39	48%
4. Revenue		
Large hospitals	20	25%
Middle hospitals	29	36%
Small hospitals	32	40%
Total	*81*	*100%*

Hypothesis
The statistical validity of hypothesis is statistical tested by quantifying financial ratios for each group and by one-way ANOVA. The following hypotheses were formulated:

Null hypothesis:
H_{0yz}: There is no significant difference in financial ratio y of hospitals in case z under study.
Alternative hypothesis:
H_{1yz}: There is a significant difference in financial ratio y of hospitals in case z under study.

Where,
y = (X1, X2, …, X10)
z = (Location, type, revenue and activities)

The F statistic was calculated to conduct means test on different categories of hospitals. If F < F critical of P-value > Pα = 0.05, the null hypothesis is accepted, otherwise the null hypothesis is rejected and the alternative hypothesis is accepted.

Results

This section presents the results of the ANOVA. The test indicates eventually significantly differences in financial performance between hospitals.

Comparison of top-clinical and general hospitals

Table 6.8 compares top-clinical hospitals with general hospitals. The determined mean values of equity financing ratio and operating profit margin favoured the general hospitals above the top-clinical hospitals. However, there are no significant differences observed between top-clinical and general hospitals on any of the measures of liquidity ratios, leverage ratios, profitability ratios, activity ratios. Since F-value < F critical (at 5% significance level), thus, the null hypothesis is accepted and the alternative hypothesis is rejected. On the other hand is found that, the B-segment revenues as a percentage of the total revenues are significant higher for top-clinical hospitals than for general hospitals.

Table 6.8 Comparison of top-clinical and general hospitals.

Financial ratios Type hospital	**Top-clinical hospitals** *N = 25*		**General hospitals** *N = 56*		**Univariate statistics**		
	Mean	SD	Mean	SD	F- value	p-value	F-critical
Liquidity ratios							
Current ratio	0.67	0.14	0.68	0.23	0.040	0.842	3.962
Days cash on hand	19.80	26.14	15.99	28.30	0.329	0.568	3.962
Leverage ratios							
Equity financing ratio	10.84	3.77	11.33	4.96	0.201	0.655	3.962
Budget ratio	12.21	3.73	12.93	6.05	0.299	0.586	3.962
Interest times earned ratio	1.60	0.75	1.63	1.54	0.009	0.923	3.962
Debt service coverage ratio	1.76	0.44	1.82	0.59	0.174	0.677	3.962
Profitability ratios							
Operating profit margin	3.78	1.65	3.92	1.91	0.096	0.758	3.962
Net profit margin	1.40	1.39	1.45	1.58	0.018	0.894	3.962
Return on assets	1.31	1.32	1.27	1.23	0.023	0.880	3.962
Basic Earning Power	3.26	1.36	3.37	1.38	0.112	0.739	3.962
Activity ratios							
Total assets turnover	0.89	0.18	0.90	0.18	0.045	0.832	3.962
Fixed assets turnover	1.38	0.44	1.37	0.37	0.013	0.910	3.962
Other ratios							
B-segment to total revenue	0.19	0.05	0.16	0.03	8.538	0.005	3.962

Comparison of hospital activities

The results in table 6.9 show mixed and other hospitals have different financial ratios, but only for current ratio and operating profit margin (at 10% significant level) are the null hypothesis rejected and the alternative hypothesis accepted. This result shows that mixed hospital have a worse current ratio and operating profit margin. The lower current ratio is primarily due to the late billing and collection of DBCs. For the other financial ratios it cannot be approved that hospital activities has a significant effect on the financial ratios. In exception of the B-segment to total revenue, because hospitals that provide nursing, care and home care activities generate a significant lower part of their revenues from the B-segment than the other hospitals.

Table 6.9 Comparison of hospital activities.

Financial ratios Activities	**Mixed hospitals** *N = 14*		**Other hospitals** *N = 67*		Univariate statistics		
	Mean	SD	Mean	SD	F- value	p-value	F-critical
Liquidity ratios							
Current ratio*	0.59	0.17	0.70	0.21	3.454	0.067	3.962
Days cash on hand	13.65	24.02	17.90	28.34	0.274	0.602	3.962
Leverage ratios							
Equity financing ratio	12.96	5.16	10.81	4.44	2.569	0.113	3.962
Budget ratio	13.68	5.79	12.51	5.37	0.537	0.466	3.962
Interest times earned ratio	1.24	0.40	1.70	1.45	1.343	0.250	3.962
Debt service coverage ratio	1.80	0.55	1.80	0.55	0.001	0.976	3.962
Profitability ratios							
Operating profit margin	3.12	0.85	4.03	1.94	2.926	0.091	3.962
Net profit margin*	0.87	1.25	1.55	1.54	2.382	0.127	3.962
Return on assets	0.86	1.21	1.37	1.25	1.907	0.171	3.962
Basic Earning Power	2.97	0.79	3.41	1.45	1.227	0.271	3.962
Activity ratios							
Total assets turnover	0.97	0.19	0.88	0.18	2.663	0.107	3.962
Fixed assets turnover	1.39	0.43	1.38	0.39	0.007	0.933	3.962
Other ratios							
B-segment to total revenue	0.12	0.05	0.20	0.04	40.409	0.000	3.962

*Significantly different at 0.10 level (or $p < .10$)

Comparison of hospital location

Table 6.10 show between the analysed hospitals some differences in mean and standard deviation. Hospitals in the Randstad tend to have better profitability ratios. However, the results indicate that there are no significant differences in liquidity ratios, leverage ratios, profitability ratios and activity ratios (at 5% significant level). So the null hypotheses are accepted and the alternative hypothesis rejected.

Table 6.10 Comparison of hospital location.

Financial ratios Randstad	**Randstad** *N = 42*		**Outside the Randstad** *N = 39*		Univariate statistics		
	Mean	SD	Mean	SD	F- value	p-value	F-critical
Liquidity ratios							
Current ratio	0.65	0.18	0.71	0.23	1.572	0.214	3.962
Days cash on hand	16.02	26.30	18.40	29.12	0.149	0.700	3.962
Leverage ratios							
Equity financing ratio	10.97	4.27	11.41	4.99	0.183	0.670	3.962
Budget ratio	12.32	4.49	13.13	6.31	0.450	0.505	3.962
Interest times earned ratio	1.83	1.75	1.39	0.61	2.243	0.138	3.962
Debt service coverage ratio	1.83	0.56	1.77	0.55	0.300	0.585	3.962
Profitability ratios							
Operating profit margin	4.09	1.88	3.65	1.76	1.166	0.283	3.962
Net profit margin	1.52	1.41	1.34	1.62	0.283	0.596	3.962
Return on assets	1.41	1.21	1.14	1.29	0.942	0.335	3.962
Basic Earning Power	3.56	1.47	3.10	1.21	2.372	0.127	3.962
Activity ratios							
Total assets turnover	0.90	0.17	0.90	0.19	0.004	0.949	3.962
Fixed assets turnover	1.36	0.37	1.40	0.43	0.177	0.675	3.962
Other ratios							
B-segment to total revenue	0.19	0.04	0.18	0.06	0.471	0.495	3.962

Comparison of large, middle and small hospitals based on revenue

Table 6.11 presents a comparison of large, middle and small hospitals. The results of ANOVA indicate that there exists no significant difference between differences in hospitals' revenues on liquidity ratios, leverage ratios, profitability ratios and activity ratios. The null hypotheses are accepted and the alternative hypothesis rejected.

However, the small hospitals show a slight better profitability in small hospitals than in large and middle hospitals. The results also show stronger leverage ratios for small hospitals than large and middle hospitals. Besides, the results show also a significant higher B-segment for small hospitals than by middle and large hospitals. Other significant differences between groups have not been detected.

Table 6.11 Comparison of large, middle and small hospitals based on revenue.

Financial ratios Revenue	**Large hospitals** *N = 20*		**Middle hospitals** *N = 29*		**Small hospitals** *N = 32*		Univariate statistics		
	Mean	SD	Mean	SD	Mean	SD	F- value	p-value	F-critical
Liquidity ratios									
Current ratio	0.67	0.12	0.63	0.20	0.73	0.24	1.772	0.177	3.114
Days cash on hand	15.53	25.54	16.33	26.17	18.95	30.56	0.113	0.893	3.114
Leverage ratios									
Equity financing ratio	11.35	3.46	10.47	4.14	11.71	5.58	0.566	0.570	3.114
Budget ratio	12.19	3.13	12.08	4.28	13.61	7.21	0.723	0.489	3.114
Interest times earned ratio	1.57	0.75	1.43	0.59	1.82	1.98	0.666	0.517	3.114
Debt service coverage ratio	1.82	0.46	1.71	0.36	1.87	0.72	0.630	0.535	3.114
Profitability ratios									
Operating profit margin	3.42	1.38	3.80	1.65	4.23	2.17	1.242	0.295	3.114
Net profit margin	1.41	1.29	1.22	1.57	1.64	1.60	0.583	0.561	3.114
Return on assets	1.40	1.31	1.12	1.25	1.36	1.23	0.394	0.676	3.114
Basic Earning Power	3.18	1.40	3.22	1.30	3.54	1.42	0.592	0.556	3.114
Activity ratios									
Total assets turnover	0.94	0.17	0.88	0.21	0.89	0.15	0.732	0.484	3.114
Fixed assets turnover	1.49	0.42	1.30	0.44	1.38	0.34	1.358	0.263	3.114
Other ratios									
B-segment to total revenue	0.15	0.03	0.17	0.05	0.21	0.04	14.371	0.000	3.114

Conclusion

The results of one way ANOVA concluded that there exist significant differences in current ratio and operating profit margin between various hospital activities. The null hypothesis is rejected and the alternative hypothesis accepted (at 10% significant level). Other statistical analysis was done and tested hypothesis on financial ratios for different types, revenue and location of hospitals. These results indicate that there were no significant differences in financial ratios. However, in this research is found that the B-segment revenues as a percentage of the total revenues are significantly different between some groups of hospitals.

7 Financial Health Test

In chapter 6, the quantity of financial data can be overwhelming. Therefore, in this chapter the financial data will be integrated into a single financial performance measure for hospitals: A Financial Health Test. In section 7.1, investment decisions will be explained. In section 7.2, the Financial Health Test will be applied to Dutch hospitals. This chapter gives an answer to the research question: Which framework should be developed to assess the financial health of a hospital?

7.1 Investment decisions

In section 7.1.1 the Net Present Value will be discussed. In section 7.1.2 the selection of financial ratios will be explained. In section 7.1.3 financial ratio standards will be discussed.

7.1.1 Net Present Value

Investment decisions are based on positive net present value (NPV) and that is probably the most important metric (RVZ 2006). The investment (negative cash flow) will be compared with the present value of future (positive) cash flows that the project will generate. The advantage of the NPV is that the NPV take into account the time value of money. In calculating the net present value investors use the Weighted Average Cost of Capital (WACC). If the return on invested capital is greater than the organisation's WACC, than a project create a positive net present value. In this method must be taken into account subjective aspects: the residual value, future growth and so on (RVZ 2006).

Limitations practical research
The net present value method is not applicable for this research, because this method analyse future cash flows for individual hospitals and it is not possible to obtain estimations about future cash flow from the annual report of hospitals (RVZ 2006).

7.1.2 Selection of financial ratios

An analysis of the literature and interviews with banks and WfZ provide insights into financial ratios to measure the credit worthiness of hospitals. There is found that, some ratios are used in many credit worthiness tests and other are used in less credit worthiness tests. Table 7.1 show financial ratios to assess hospitals credit worthiness. The financial ratios are categorised to their dimension: profitability ratios, leverage ratios, liquidity ratios and activity ratios.

This research focuses on the most important financial ratios that measure hospitals credit worthiness. There is also a distinction made into two groups of financial ratios. The sum of these ratios is the Financial Health Test.

- **Critical ratios:** are the most important financial ratios. The selected critical ratios are: net profit margin, return on investment, debt service coverage ratio and equity financing.
- **Less critical ratios:** are important ratios but less important than the critical ratios. The selected other ratios are: days cash on hand, days in accounts receivable, and continuation ratio tangible fixed assets.

Table 7.1 Selection of financial ratios.

Financial ratios	Dutch literature				Foreign literature					Total number of times used	Interviews	This research	
	Lindenbergh and Vink 2010	Feenstra et al. 2010	Klaassens 2008	RVZ 2006	Pink 2005	Cleverly 2002	HFMA 2003	Vento 2009	Combination test 2008		2010	Critical ratios	Other ratios
Profitability													
R1 Operating margin							√			1			
R2 Net profit margin					√	√			√	3	√	√	
R3 Cash flow margin			√		√					2			
R4 Return on equity			√		√					2			
R5 Return on investment	√			√						2		√	
Leverage													
Coverage													
R6 Debt service coverage	√	√	√	√	√		√			6	√	√	
R7 Interest coverage ratio			√							1			
Structural													
R8 Equity financing ratio	√	√	√	√	√				√	6	√	√	
R9 Debt financing						√				1			
R10 Budgetratio			√							1			
R11 Debt to capitalization							√			1			
R12 Long-term debt to capitalization						√				1			
Liquidity													
R13 Current ratio			√		√		√	√		4			
R14 Quick ratio									√	1			
R15 Days cash on hand					√	√	√	√		4			√
R16 Days in accounts receivable					√			√		2	√		√
Activity													
R17 Average age of plant						√				1			√
R18 Continuation ratio tangible fixed assets								√	√	2			

The above mentioned ratios are selected, because they are most commonly used ratios in literature and practice. In the remainder of this section will be explained why these ratios are selected.

Critical ratios

According to Cleverly (2007) "without question, the most important dimension is profitability". However, the other dimensions are also important to assess hospitals' financial performance. For example, large amounts of debt can weaken overall financial health. Therefore, besides only analyzing the profitability ratios, the financial health test should also analyse leverage ratios, liquidity ratios and activity ratios.

Table 7.1 shows the most used ratios in literature are the debt service coverage and the equity financing (each 6 times), these ratios are also mentioned in the interviews. Hence, the debt service coverage ratio and the equity financing are selected as 'crucial ratios'. Another important ratio called in the interviews was the net profit margin. Thereby, the net profit margin is mentioned three times in the literature. In addition to this, the return on investment is according to RVZ (2006) a critical ratio for investment decisions. Thus, the critical ratios are: net profit margin, return on investment, debt service coverage ratio, and equity financing.

Less critical ratios

In addition to the critical ratios also other ratios are important to assess' hospitals financial performance. Although the selected other ratios are less important than the selected critical ratios.

Liquidity ratios

The liquidity ratios are important because a hospital could have a positive result and a high solvability, but a liquidity shortage can lead continuity of a hospital. According to Cleverly (2007) a hospital with a good profitability but a few days of cash may be come in trouble by unexpected events.

The current ratio measures the current assets in relation to the current liabilities. This ratio indicates or the borrower has enough liquidity to pay the lender. Borrower shall maintain a current ratio of 1.0 (see chapter 4 for an explanation). However, this ratio is subjected to manipulation through accounting practices. The financing

surplus or deficit of many hospitals affects the current ratio. This makes it difficult to compare hospitals because the settlement of the financing surplus/ deficit affects the current ratio. The current ratio is also a snapshot on the balance sheet date and may be biased on the balance sheet date by incidental items (den Hartog, Loogman et al. 2010). Therefore, the current ratio is not included in the Financial Health Test. Besides, table 7.1 shows that the days cash on hand is another commonly used liquidity ratio. The days cash on hand measure total unrestricted cash and reserves by average daily cash expenses (HFMA 2003).

Activity ratios

The age of hospital facilities is an element of overall financial strength. Hospitals with an old plant are more likely to face immediate capital replacement and renovation needs than those with younger hospital facilities (Cleverley 2007). Expenditures should be undertaken to ensure that fixed assets maintains its assessed performance standard. The accumulated depreciation and the average age of plant cannot be calculated, because the values to calculate these two ratios are not reported in the CIBG data set. On the other hand, it is important to analyse activity ratios. Therefore, an alternative activity ratio is selected, namely the continuation ratio tangible fixed assets.

7.1.3 Financial ratios standards

The standards applicable to financial ratios in the Financial Health Test are explained in this section. Based on the literature and interviews are standards developed.

A. Critical ratios

Net profit margin

The net profit margin indicates percentage profit after cost of goods sold and all expenses and is calculated as net income divided by total net revenues. The net profit margin is an important ratio because it indicates how much a hospital can build capital. Also this ratio indicates hospitals sensitivity to changes in costs and revenues. The interviewee indicates that net profit margin should be at least 1.0 percent. In the FSI test the net profit margin is normalised around an historical industry average of 4.0 per cent (Cleverley 2007). But, the FSI focuses on U.S. hospitals, which operate in another financial context than Dutch hospitals. Therefore, another standard should be applied to Dutch hospitals. The standard mentioned set by the interviewee is used. Thus, the net profit margin ratio is standardised around 1.0 per cent.

Table 7.2 Net profit margin standard.

Financial ratios	Foreign literature		Interviews	This research
	Cleverly FSI 2002	Combina-tion test 2008	2010	
Profitability				
R1 Net profit margin*	> 4.00%	> 0.00%	> 1.00%	> 1.00%

* In the Dutch literature is no standard specified.

Return on investment

According to RVZ (2006) and Vink and Lindenbergh (2010) the return on investment (ROI) is another commonly used credit worthiness measurement. In chapter 4.6.4 is explained that the ROI should be minimal equal to the WACC, for the reason there is value creation if the ROI is greater than the WACC. The determination of the WACC is not part of this research. Nevertheless, to get an idea of the WACC, in Table 7.3 the results from previous studies are shown. In this research, a conservative WACC of 5.00% is used. This standard is also held by the RVZ (2006) and this value is under the standard of 6.13% and approximately 7.00%, set by Gupta Strategists (2006) and Fakton (Hamers, Schoenmaker et al. 2009), respectively. Otherwise, the outcome of the

WACC estimation may differ between hospitals simply due to the variability in risks between hospitals. These differences between hospitals are not accounted. The standard WACC is 5.0 per cent thus, the ROI must be above 5.0 per cent.

Table 7.3 Return on investment standard.

Financial ratios	Dutch literature				Foreign literature				Interviews	This research
	Lindenbergh and Vink 2010	Gupta Strategists A-segment 2006	Gupta Strategists B-segment 2006	RVZ 2006	Finance ideas this situation 2007	Finance ideas future situation 2007	Fakton health care capital 2009	Fakton real estate capital 2009	2010	
Profitability										
R2 Return on investment	> WACC	6-7% (WACC)	6-8% (WACC)	> WACC	4.81% (WACC)	6.46% (WACC)	3.56% (WACC)	6.13% (WACC)	no standard specified	> 5.00%

Equity financing

The equity financing is determined by dividing equity by total assets. Banks and WfZ prefer a ratio of 15 per cent or more (see table 7.4 and see chapter 4 for an explanation). Lower values maybe indicate a greater financial risk than higher values. In the loan agreement could be made minimum requirements for the equity financing. In the future is a value of 20 per cent to 25 per cent desirable but at this stage such a value is too high, especially when compared against the financial situation of hospitals in 2007 and 2008. Thus, in this research the standard equity financing ratio is 15 per cent.

Table 7.4 Equity financing ratio standard.

Financial ratios	Dutch literature				Foreign literature		Interviews	This research
	Lindenbergh and Vink 2010	Feenstra et al. 2010	Havermans 2010	RVZ 2006	Cleverly 2002	Combina-tion test 2008	2010	
Profitability								
R3 Equity financing	> 20-30%	> 13-16%	> 15%	> 25%	> 50%	> 25%	> 10-15%	> 15%

Debt service coverage ratio

Table 7.5 shows the interviewee indicates a standard DSCR of 1.20 times or higher. In addition, the standard of 1.2 times is often cited in the literature (RVZ 2006; Feenstra, van Helden et al. 2010). Therefore it is suggested that the DSCR must be at least 1.2 times. This minimum value should be realized under different scenarios. But, the higher the DSCR, the easier it is for the hospital to fulfill interest and repayment obligations.

Table 7.5 Debt service coverage ratio standard.

Financial ratios	Dutch literature			Foreign literature		Interviews	This research
	Lindenbergh and Vink 2010	Feenstra et al. 2010	RVZ 2006	HFMA Broad Access 2003	HFMA Limited Access 2003	2010	
Profitability							
R4 Debt service coverage ratio	> 1.2-1.4	> 1.2-1.4	> 1.2-1.4	> 3.5	> 1.25	> 1.2	> 1.2

B. Less critical ratios

Days cash on hand

This ratio gives an indication of how many days a hospital can continue to pay bills assuming that a hospital receives no income. A high value indicates a better financial position. On the other hand, a too high value implies less optimal utilisation of the hospitals' recourses. Table 7.6 shows the HFMA limited access criteria suggests that at least 5 days is desirable (HFMA 2003). In this research this conservative standard is used.

Table 7.6 Days cash on hand standard.

Financial ratios	Foreign literature				Interviews	This research
	Cleverly	HFMA Broad Access	HFMA Limited Access	Vento		
	2002	2003	2003	2009	2010	
Liquidity						
R5 Days cash on hand*	> 50 days	N/A	> 5 days	no decreasing cash from year-to-year	no standard specified	> 5 days

* In the Dutch literature is no standard specified.

Days in accounts receivable

Table 7.7 shows the standard days in accounts receivable for Dutch Hospitals, as is mentioned in the foreign literature and the interviews. One interviewee mentions a minimum of ninety days accounts in receivables for hospitals. Hospitals need to collect money from customers in time so, that they will have no problems in paying their debt. Otherwise hospitals must finance the incurred costs. Therefore, the standard of ninety days accounts in receivable is selected. This standard is mentioned in the interviews and as is commonly used for Dutch hospitals.

Table 7.7 Days in accounts receivable standard.

Financial ratios	Foreign literature	Interviews	This research
	Vento		
	2009	2010	
Liquidity			
R6 Days accounts receivable*	< 55 days	< 90 days	< 90 days

* In the Dutch literature is no standard specified.

Continuation ratio tangible fixed assets

It is important to achieve at least a continuation ratio of 1.0 times to ensure the continuation of tangible fixed assets (Kesteloot and van Herck 2008; Vento 2009). However, the continuation ratio is best calculated over more years, because most investment projects are implemented over a longer period. In the combination test a standard of 1.0 is also used. Therefore a standard of 1.0 is applied within this research.

Table 7.8 Continuation tangible fixed assets standard.

Financial ratios	Foreign literature		Interviews	This research
	Vento	Combina-tion test		
	2009	2010	2010	
Activity				
R7 Continuation ratio tangible fixed assets*	> 1.0	> 1.0	no standard specified	> 1.0

* In the Dutch literature is no standard specified.

Summary

In this chapter a Financial Health Test for hospitals is developed. Table 7.9 shows this test and the minimum capital access criteria for hospitals. The Financial Health Test is the first step in assessing the credit worthiness of a hospital. The Financial Health Test is based on literature and practical research.

Table 7.9 The Financial Health Test.

Financial ratio	Minimum access criteria
A. Critical ratios	
Profitability	

R1: Net profit margin	more than 1.0 per cent
R2: Return on investment	more than 5.0 per cent
Leverage	
R3: Equity financing ratio	more than 15 per cent
R4: Debt service coverage ratio	more than 1.2 times
B. Less critical ratios	
Liquidity	
R5: Days cash on hand	more than 5 days
R6: Days in accounts receivable	less than 90 days
Activity	
R7: Continuation ratio tangible fixed assets	more than 1.0 times

7.2 Application of the Financial Health Test

The Financial Health Test described in the previous section is applied to Dutch hospitals. In consequence, the seven financial ratios in the Financial Health Test were calculated for all Dutch hospitals. Then the number of hospitals that met the standards in 2007 and 2008 is analysed. In table 7.9 the standards are shown. The results in table 7.10 indicate the number and percentage of hospitals that meets a specific financial ratio. The desired future direction is indicated by an up or down arrow.

Table 7.10 Hospitals that performed better than standard in 2008 and 2007.

Financial ratio	Hospitals that performed better than standard				Desired future direction
	2008		2007		
	Number	Per cent	Number	Per cent	
Critical financial ratios					
R1 Net profit margin	45	54.88%	42	51.22%	↑
R2 Return on investment	17	20.73%	13	15.85%	↑
R3 Equity financing ratio	14	17.07%	11	13.41%	↑
R4 Debt service coverage ratio	74	90.24%	67	81.71%	↑
Less critical financial ratios					
R5 Days cash on hand	39	47.56%	40	48.78%	↑
R6 Days in accounts receivable	50	60.98%	44	53.66%	↓
R7 Continuation ratio tangible fixed assets	66	80.49%	68	82.93%	↑

Critical ratios

Table 7.10 shows, the most difficult critical financial ratios to meet are the return on invested capital and the equity financing ratio. The net profit margin and the debt service coverage ratio and equity standards are achieved by most hospitals.

Most hospitals perform better than the net profit margin standard of 1.0 per cent. But, the net profit margin is affected by occasional ex-post reimbursement. In the future, the net profit margin should be structurally higher than in 2007 and 2008 to increase the equity capital. This increase should be achieved by lower operational costs and revenue growth. Attention should be paid to possible government discounts, which also may affect the hospitals' financial position and result in additional required savings. Besides, investments in real estate have large effects on the net profit margin, because it is expected that investments lead to higher depreciation expenses.

Most hospitals had a return on investment lower than 5.0 per cent. As with the net profit margin should take into account pressures on the results that affect negatively the net profit margin. Therefore it is necessary to improve the return on investment.

Most hospitals did not meet the equity financing standard of 15 per cent. As a consequence, many hospitals are financially vulnerable. It will cost hospitals time to raise the level of equity capital. Since, the only sources to equity capital are positive operating results. Very low equity financing values may indicate a greater exposure to financial risk because debt service is a fixed charge. A bottleneck could be negative results from an impairment test.
The results indicate most hospitals meet the debt service coverage ratio standard of 1.2 times. In the future are improvements of the DSCR desirable due to expected shorter depreciation periods and higher depreciation expenses. Raising interest rates or pressures on the income will also lower the DSCR. However, interest rate derivates can be used to manage interest rate risks.

Less critical ratios
Most hospitals perform above the days cash on hand standard of 5 days. In 2008 the in accounts receivable improved for hospitals. Most hospitals meet the days on accounts receivable standard. Table 7.10 shows also the continuation ratio tangible fixed assets are for most hospitals above the standard.

Table 7.11 shows the number of year's hospitals performed better than the standard. Thus, or a hospital performed better than standard in less than one, or one or two years.

Table 7.11 Hospitals that performed better than standard in less than one, one or two years.

Financial ratio	Hospitals that performed better than standard			
	0 of 2 years	1 of 2 years	2 of 2 years	Total
Critical financial ratios				
R1 Net profit margin	20	37	25	82
	[24.39%]	[45.12%]	[30.49%]	[100%]
R2 Return on investment	58	18	6	82
	[70.73%]	[21.95%]	[7.32%]	[100%]
R3 Equity financing ratio	66	7	9	82
	[80.49%]	[8.54%]	[10.98%]	[100%]
R4 Debt service coverage ratio	3	17	62	82
	[3.66%]	[20.73%]	[75.61%]	[100%]
Less critical financial ratios				
R5 Days cash on hand	33	19	30	82
	[40.24%]	[23.17%]	[36.59%]	[100%]
R6 Days in accounts receivable	22	26	34	82
	[26.83%]	[31.71%]	[41.46%]	[100%]
R7 Continuation ratio tangible fixed assets	5	20	57	82
	[6.10%]	[24.39%]	[69.51%]	[100%]

Table 7.12 indicates the number of hospitals performed better than the critical standards in 2007 and 2008. The results show most hospitals meets one or two of the four standards. One hospital did not perform better than any critical standard in 2007 and 2008.

Table 7.12 Number of critical and less critical ratio standards met in 2007 and 2008.

Number of critical ratio standards met in 2007	Number of critical ratio standards met in 2008					
	0	**1**	**2**	**3**	**4**	**Total**
0	1	6	1	3	0	**11**
	[1%]	[7%]	[1%]	[4%]	[0%]	[13%]
1	1	16	6	5	1	**29**
	[1%]	[0]	[7%]	[6%]	[1%]	[35%]
2	1	7	10	7	0	**25**
	[1%]	[9%]	[12%]	[9%]	[0%]	[30%]
3	0	1	0	1	1	**3**
	[0%]	[1%]	[0%]	[1%]	[1%]	[4%]
4	0	5	3	5	1	**14**
	[0%]	[6%]	[4%]	[6%]	[1%]	[17%]
Total	**3**	**35**	**20**	**21**	**3**	**82**
	[4%]	[43%]	[24%]	[26%]	[4%]	[100%]

Number of less critical ratio standards met in 2007	Number of less critical ratio standards met in 2008				
	0	**1**	**2**	**3**	**Total**
0	2	3	0	0	**5**
	[2%]	[4%]	[0%]	[0%]	[6%]
1	2	10	7	4	**23**
	[2%]	[12%]	[9%]	[5%]	[28%]
2	1	7	19	6	**33**
	[1%]	[9%]	[23%]	[7%]	[40%]
3	0	1	8	12	**21**
	[0%]	[1%]	[10%]	[15%]	[26%]
Total	**5**	**21**	**34**	**22**	**82**
	[6%]	[26%]	[41%]	[27%]	[100%]

Table 7.13 gives an indication of the number of total standards (critical and other) a hospital meets. Currently most hospitals meet three or four of the seven criteria. None hospitals did not meet any criteria. Table 7.13 indicates that no hospital performed better than all the standards in 2007 and 2008. Between hospitals it is remarkable that there are large variations in financial performance. Some hospitals meet several criteria, while other hospitals barely meet criteria. In the future improvements are necessary to still meet the criteria. Otherwise hospitals are facing difficulties to attract new long-term debt. This inhibits the ability to invest in fixed assets.

Table 7.13 Total number of ratio standards met in 2007 and 2008.

Total number of ratio standards met in 2007	Total number of ratio standards met in 2008								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
0	0	0	0	1	0	0	0	0	**1**
	[0%]	[0%]	[0%]	[1%]	[0%]	[0%]	[0%]	[0%]	[0%]
1	0	0	1	1	1	0	0	0	**3**
	[0%]	[0%]	[1%]	[1%]	[1%]	[0%]	[0%]	[0%]	[4%]
2	0	3	7	2	3	0	1	0	**16**
	[0%]	[4%]	[9%]	[2%]	[4%]	[0%]	[1%]	[0%]	[20%]
3	0	0	3	9	7	2	2	0	**23**
	[0%]	[0%]	[4%]	[11%]	[9%]	[2%]	[2%]	[0%]	[28%]
4	0	0	0	2	9	6	1	0	**18**
	[0%]	[0%]	[0%]	[2%]	[11%]	[7%]	[1%]	[0%]	[22%]
5	0	0	1	5	3	5	3	0	**17**
	[0%]	[0%]	[1%]	[6%]	[4%]	[6%]	[4%]	[0%]	[21%]
6	0	0	1	0	0	2	0	1	**4**
	[0%]	[0%]	[1%]	[0%]	[0%]	[2%]	[0%]	[1%]	[5%]
7	0	0	0	0	0	0	0	0	**0**
	[0%]	[0%]	[0%]	[0%]	[0%]	[0%]	[0%]	[0%]	[0%]
Total	**0**	**3**	**13**	**20**	**23**	**15**	**7**	**1**	**82**
	[0%]	[4%]	[16%]	[24%]	[28%]	[18%]	[9%]	[1%]	[100%]

According to Klaassen (2008) it is not so that hospitals that fail to meet the financial ratio standards cannot obtain financing. For hospitals that show a positive development on the basis of a realistic long-term prognosis might it be easier to get financing than hospital with a high solvency but a negative trend.

8 Conclusions

With the results of this research I can answer the research questions. In this chapter I will answer the research questions one to five and the main research question.

Research design
A literature review identified a list of financial ratios to assess the financial performance of hospitals. In addition, banks were interviewed to give practical comments on the selection of financial ratios for hospitals. Financial ratio analysis is used to determine whether hospitals have improved their financial performance in 2008. The hospitals were subdivided into groups, based on type, location, revenue and activities for further comparison of their financial performance. I applied statistical analysis; Analysis of Variance (ANOVA) to test the hypotheses. The data for the research were obtained from the CBG and included hospitals.

1. What are the developments in the health care real estate?
With the introduction of the Health Care Institutions Act health care institutions have become responsible for their real estate. Hospitals have to refund the money they spend for housing from their provided health care. These changes have impact on hospitals' financial performance. Health care is a dynamic and continually evolving industry. Also, health care is a capital-intensive industry that requires continual technological improvements. In addition, not-for-profit hospitals do not have access to equity market capital. Thus, their only source of capital is operating cash flow and debt.

2. What are relevant financial ratios to determine the financial performance of Dutch general hospitals?
Financial ratio analysis is "an accepted approach to hospital performance evaluation" (Zeller, Stanko and Cleverly, 1996). In this research is financial ratio analysis applied to evaluate the financial performance of hospitals. A literature research identified six financial ratio categories: liquidity ratios, leverage ratios, profitability ratios, cash flow from operation ratios, activity ratios and other ratios. These categories include sixty-six ratios.

3. Which financial ratios are actually used in practice?
An important requirement for hospitals set by banks and the WfZ is that there is a 'realistic' and 'feasible' business plan. The business plan is a critical component in obtaining financing and WfZ guarantee. This research focuses on the financial part of the business plan by the use of financial ratios. Parts of the financial business plan are financial forecasts of the balance sheet, profit and loss account and cash flow statement. Scenario analysis should analyse the consequences of variations in assumptions, in order to assess whether the operating cash flow is sufficient to pay interest and principal to the lenders. It is important to take into consideration in the business plan uncertainties in the areas of politics and of health care demand.
The hospital managers and their advisors should consider the following important aspects when drawing up a business plan. These aspects are derived from the results of the interviews with banks and WfZ.

- **Depreciation period and interest margin:** In hospitals long-term estimates should take into account shorter depreciation periods and thus shorter repayment periods and higher annual repayments. Also higher interest rates must be observed because of the increased risk for banks. Interest differentiation may arise between hospitals because of differences in risk among hospitals. Moreover, the requirements set by Basel III for banks may affect the financing and the interest margins that hospitals pay. Finally, it is also possible that banks no longer finance hundred per cent. As a result, hospital managers should ensure alternative funding.
- **Interest standards:** The abolition of interest standards leads to necessity for hospitals managers to control interest rate risks, in order to minimise the impact on their business plans. Interest rate derivates

could be used to control interest rate risks. A test used by the WfZ is that up to fifteen to twenty per cent of the loans can stand open to interest revision or refinancing.

- **WfZ and Go Cure:** Hospitals can get an interest benefit on their loan by the WfZ-guarantee and the Guarantee Business Financing Curative Health Care (in Dutch: Garantie ondernemingsfinanciering curatieve zorg, Go cure). The Go Cure is available for investments up to fifty million euro and guarantees 50 per cent of a new bank loan. WfZ-guarantees can in principle also be given in the case of larger investments. However, it is nowadays conceivable that WfZ don't give a guarantee for the entire funding by large financing.
- **Period:** The business plan must mainly show the eligibility of the project in the first five to ten years after the investment. Frequently, this period is the most critical period because of the so-called 'bath-tub' (expenditures are larger than income) after the investment.
- **Minimal values:** It is currently usual to set minimal values for financial ratios in the credit agreement (for example: debt service coverage ratio and equity financing). So, a bank can intervene when a hospital does not meet the specified minimum values.
- **Consortium:** For investments above 125 to 150 million euro, banks generally prefer to provide financing with several banks in a consortium.
- **Mortgage registration:** Banks and WfZ indicate that, in the case of the granting of a loan, a mortgage registration has become a standard, even though the alternative use of hospital buildings is limited. However, in case of bankruptcy, this gives banks and WfZ a stronger position in comparison with other creditors.

4. What is the financial performance of Dutch general hospitals?

The overall results suggest that the financial performance of hospitals is improving. However, the financial performance of most hospitals is still below the requirements. Also there are large variations among hospitals in financial performance.

Liquidity

The liquidity ratios indicate that for most hospitals, current liabilities exceed the current assets. The low liquidity is mainly due to the late closure of DBC's and late invoice. The recovery of large repayment obligations to health care insures has implications for hospitals. In total hospitals should repay around two billion health care insurers. Banks indicates that they are also reluctant to provide significant finance for working capital.

Leverage

In 2008 the equity financing ratio had increased by 3.42 per cent to 10.0 per cent. The increase is mainly because of accounting rules and is caused by the shift of the equalisation reserves to equity capital. The possible impairment losses could have substantial impact on the equity capital of hospitals, because this loss should be written-down as a loss. A few hospitals have already done so. These hospitals also have an equal amount of accounts receivables against the Ministry of VWS. However, these accounts receivables are only partially collectible. With this small proportion of equity creditors would probably be somewhat cautious about lending funds to these hospitals.

Profitability

The profitability of hospitals, measured by the net profit margin was approximately 1.0 per cent in 2008. The small increase in net profit margin compared to 2007 indicates that hospitals have improved their profitability. However, the net profit margin is affected by occasional ex-post reimbursement. Future improvements are necessary to achieve positive operating results to increase the amount of equity capital. The B-segment revenue increased to on average of 18 per cent. This is caused by the expansion of the B-segment by January 1, 2008 and the inclusion of the cost of capital component in the B-segment.

Cash flow
The cash flow from investing activities is greater than the cash flow from operating activities for most hospitals. The investments were financed with short-term debt and equity, but also with new long-term loans.

Activities
Hospitals belong to a capital intensive industry and therefore have to make large investments to generate revenues. It is also evident that the economic state of hospital buildings varies strongly between hospitals.

Other
The B-segment revenue has increased on average to eighteen per cent. This is caused by the expansion of the B-segment since January 1, 2008 and the inclusion of the cost of capital component in the B-segment.

5. What are the differences in financial performance between different groups of hospitals?
Hypotheses were tested as to there were significant differences in liquidity ratios, leverage ratios and profitability ratios between hospitals. The results show that there were no significant differences in financial ratios between hospitals among variations in hospitals type (top-clinical and general), variations in location (Randstad and outside the Randstad) and variations in hospitals revenue (large, middle and small). Only hospitals that provide nursing, care and home care activities show a significant lower current ratio and operating margin than other hospitals. The lower current ratio is primarily due to the late billing and collection of DBCs.
In this research is found that the B-segment revenues as a percentage of the total revenues are significant higher for top-clinical hospitals than for general hospitals. Hospitals that provide nursing, care and home care activities generate a significant lower part of their revenues from the B-segment than the other hospitals. The results show also a significant higher B-segment for small hospitals than by middle and large hospitals. Other significant differences between groups have not been detected.

Main research question: Which framework should be developed to assess the financial health of a hospital?
In this research a Financial Health Test for hospitals is developed. Table 8.1 shows this test and the minimum capital access criteria for hospitals. The Financial Health Test is the first step in assessing the credit worthiness of a hospital. The Financial Health Test analyse four financial performance dimensions: profitability, leverage, liquidity and activity.

Table 8.1 The Financial Health Test.

Financial ratio	**Minimum access criteria**
A. Critical ratios	
Profitability	
R1: Net profit margin	more than 1.0 per cent
R2: Return on investment	more than 5.0 per cent
Leverage	
R3: Equity financing ratio	more than 15 per cent
R4: Debt service coverage ratio	more than 1.2 times
B. Less critical ratios	
Liquidity	
R5: Days cash on hand	more than 5 days
R6: Days in accounts receivable	less than 90 days
Activity	
R7: Continuation ratio tangible fixed assets	more than 1.0 times

9 Recommendations

This chapter discusses the recommendations of this research. In section 9.1 I will discuss the recommendations for practice. These are recommendations for hospital managers and their advisors to assess the credit worthiness of a hospital. Section 9.2 provides recommendations for further research.

9.1 Recommendations for practice

This section gives the following recommendations for practice.

Financial performance improvements
Hospitals need to improve their financial performance, especially regarding equity financing ratio, return on investment and net profit margin. These improvements are necessary to obtain long-term financing for investments in tangible fixed assets.

Use the Financial Health Test
The results of this research provide some insights into evaluation hospitals performance. The Financial Health Test can be used by hospital managers in determining their credit worthiness. The model is developed on the basis of literature and practical research.

Early warning system
The Financial Health Test developed to analyse hospitals credit worthiness is a useful test for hospital managers and their advisors and provides them the possibility to avoid financial distress through an early warning system.

Financial requirements set by banks and the WfZ
In this research the financial requirements set by banks and the WfZ are found. The business plan made by hospital managers and their advisors needs to include these aspects.

Look more deeply into financial ratios
It is recommended for hospital managers to look more deeply into financial ratios, since, until now; financial ratios have been applied only in a limited way in the annual reports of hospitals.

9.2 Recommendations for future research

On the basis of this research the following is recommended for future research.

Insolvency
Future research should investigate the degree to which a financial ratio is able to predict insolvency. The findings of that research could make it possible to predict financial distress in hospitals. Also, an insolvency model would help a manager to monitor a hospital's financial performance.

Repeat this research

This research is limited by the fact that only two years financial data were available from the hospitals. In the future this research should be repeated to evaluate the financial performance of hospitals over a longer period.

Non-financial factors

In credit analysis non-financial factors are also important, for example quality of management, medical staff, and employees and so forth. Attention should be paid to these aspects. Future research should investigate the most important aspects in this analysis and develop standards for these aspects.

Relation between non-financial factors and financial ratios

Future research could examine whether non-financial factors affect a hospital's financial performance, and investigate the relation between non-financial factors and financial ratios.

Weights

The degree of importance of the different financial ratios may be varying. However, the degree of importance can be indicated by assigning weights to the financial ratios. In this research no weights are imposed on the financial ratios in the Financial Health Test. Future research can focus on the determination of weights. In order to develop a test to monitor a hospitals overall financial performance score.

Factor analysis

In this research I analyse sixty-six financial ratios. In reducing the number of ratios I used factor analysis. Several previous researches (Zeller, Stanko et al. 1996; Watkins 2000) use factor analysis to reduce the number of ratios to analyse hospital performance. Factor analysis creates factors that summarise the corresponding financial ratios for a financial performance analysis.

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Appendix I Balance sheet

Assets	**Liabilities and equity**
Fixed assets	**Equity**
Intangible assets	Capital
Tangible assets	Collectively financed tied-up capital
Financial assets	Non-collectively financed tied-up capital
Total fixed assets	***Total equity***
Current assets	**Provisions**
Inventories	
Work in progress on account of DBC's	**Long-term liabilities**
Accounts receivable and accrued income	
Accounts receivable on account of financing deficit	**Current liabilities**
Securities	Liabilities on account of financing surplus
Liquid assets	Current liabilities and accrued expenses and deferred income
Total current assets	***Total current liabilities***
Total assets	**Total liabilities**

Appendix II Income statement

INCOME STATEMENT 2008
Total operating revenues
Health Care Tariffs Act Budget
DBC revenues B-segment
Non-budgeted care performance
Other operating revenues
Total operating revenues
Operating expenses
Personnel costs
Depreciation and amortization
Other expenses
Total operating expenses
Earnings before interest and taxes (EBIT)
Interest income and expenses
Earnings before taxes (EBT)
Taxes
Result after tax
Miscellaneous income and expenses
Extraordinary income and expenses
Net income

Appendix III Cash flow statement

Cash flow from operating activities

Net income

Mutations for:
Depreciation and amortization
Provisions

Increase (decrease) in:
- Inventories
- Work in progress on account of DBC's
- Accounts receivable
- Financing surplus/ deficit
- Current liabilities (excluded liabilities to credit institutions)

Interest income
Interest expenses
Miscellaneous income and expenses
Extraordinary income and expenses

Total cash flow from operations

Cash flow from investing activities

Capital expenditure tangible fixed assets
Desinvesteringen materiele vaste activa
Capital expenditure intangible fixed assets

Total cash flow from investing activities

Cash flow from financing activities

Increase in long-term debt
Payments on long-term debt

Total cash flow from financing activities

Change in cash (on balance sheet)

Appendix IV List of persons interviewed

Name	Organisation	Function
1. Mr A. van Oord	BNG	Commerce business manager
2. Mrs A. Ronckers	Rabobank	Finance specialist
3. Mr L. Dijkstra	ABN AMRO	Manager social services
4. Mr H. Bellers	WfZ	Director
5. Mr E. Landbrug	Gemini ziekenhuis	Finance director

Appendix V Overview of studied hospitals

Nr.	Name of hospitals	Place	Top-clinical hospitals	General hospitals	Mixed hospitals	Other hospitals	Randstad	Outside the Randstad	Large hospitals	Middle hospitals	Small hospitals
1	Stichting Isala Klinieken	Zwolle	1		1			1	1		
2	Zorggroep Noorderbreedte	Leeuwarden	1		1			1	1		
3	Stichting Alysis Zorggroep	Arnhem	1		1			1	1		
4	Stichting Sint Antonius Ziekenhuis	Nieuwegein	1			1	1		1		
5	Stichting Amphia	Breda	1			1	1		1		
6	Stichting HagaZiekenhuis	's-Gravenhage	1			1	1		1		
7	Stichting Onze Lieve Vrouwe Gasthuis	Amsterdam	1			1	1		1		
8	Stichting Medisch Centrum Alkmaar	Alkmaar	1			1	1		1		
9	Stichting Medisch Centrum Haaglanden	's-Gravenhage	1			1	1		1		
10	Stichting Albert Schweitzer Ziekenhuis	Dordrecht	1			1	1		1		
11	Stichting Máxima Medisch Centrum	Veldhoven	1			1	1		1		
12	Stichting Reinier de Graaf Groep	Delft	1			1	1			1	
13	Stichting Kennemer Gasthuis	Haarlem	1			1	1			1	
14	Sint Lucas Andreas Ziekenhuis	Amsterdam	1			1	1			1	
15	Stichting Sint Franciscus Gasthuis	Rotterdam	1			1	1			1	
16	Stichting Interconfessioneel Spaarne Ziekenhuis	Hoofddorp	1			1	1			1	
17	Stichting Medisch Spectrum Twente	Enschede	1			1		1	1		
18	Stichting Catharina-ziekenhuis	Eindhoven	1			1		1	1		
19	Stichting Jeroen Bosch Ziekenhuis	's-Hertogenbosch	1			1		1	1		
20	Stichting Atrium Medisch Centrum Parkstad	Heerlen	1			1		1	1		
21	Stichting Nijmeegs Interconfessioneel ziekenhuis Canisius-Wilhelmina	Nijmegen	1			1		1	1		
22	Stichting St. Elisabeth Ziekenhuis	Tilburg	1			1		1		1	
23	Stichting Algemeen Christelijk Ziekenhuis Groningen	Groningen	1			1		1		1	
24	Stichting Viecuri, Medisch Centrum voor Noord-Limburg	Venlo	1			1		1		1	
25	Stichting Deventer Ziekenhuis	Deventer	1			1		1		1	
26	Stichting Rivas Zorggroep	Gorinchem		1	1		1		1		
27	Stichting Rijnland Zorggroep	Leiderdorp		1	1		1			1	
28	Stichting Bronovo-NEBO	's-Gravenhage		1	1		1				1
29	Stichting Leveste	Emmen		1	1			1		1	
30	Stichting Pantein	Boxmeer		1	1			1		1	
31	Stichting ZorgSaam Zeeuws-Vlaanderen	Terneuzen		1	1			1		1	
32	Stichting Zorgcombinatie "Noorderboog"	Meppel		1	1			1		1	
33	Stichting St. Anna Zorggroep	Geldrop		1	1			1		1	
34	Stichting Zorggroep Middenveld Drenthe	Hoogeveen		1	1			1			1
35	Stichting Saxenburgh Groep	Hardenberg		1	1			1			1
36	Stichting Zorggroep Pasana	Dokkum		1	1			1			1
37	Stichting Maasstad Ziekenhuis	Rotterdam		1		1	1		1		
38	Meander Medisch Centrum	Amersfoort		1		1	1			1	
39	Stichting Tergooiziekenhuizen	Hilversum		1		1	1			1	
40	Stichting Diakonessenhuis	Utrecht		1		1	1			1	
41	Stichting Algemeen Ziekenhuis Westfries Gasthuis	Hoorn NH		1		1	1			1	
42	Stichting Tweesteden Ziekenhuis	Tilburg		1		1	1			1	
43	Stichting Groene Hart Ziekenhuis	Gouda		1		1	1			1	
44	Stichting Samenwerkende Schiedamse en Vlaardingse Ziekenhuizen (S.S.V.Z.)	Schiedam		1		1	1			1	
45	Slotervaartziekenhuis B.V.	Amsterdam		1		1	1			1	
46	Stichting Zaans Medisch Centrum	Zaandam		1		1	1			1	
47	Stichting Elkerliek Ziekenhuis	Helmond		1		1	1			1	
48	Stichting Rode Kruis Ziekenhuis	Beverwijk		1		1	1				1
49	Stichting IJsselland Ziekenhuis	Capelle aan den IJssel		1		1	1				1
50	Stichting R.K. Ziekenhuis St. Franciscus	Roosendaal		1		1	1				1
51	Stichting Ziekenhuis " Lievensberg "	Bergen op Zoom		1		1	1				1
52	Stichting Waterlandziekenhuis	Purmerend		1		1	1				1
53	Stichting Protestants Christelijk Ziekenhuis Ikazia	Rotterdam		1		1	1				1
54	Christelijke Vereniging "Het Diaconessenhuis"	Leiden		1		1	1				1
55	Stichting Zuwe Hofpoort Ziekenhuis	Woerden		1		1	1				1
56	Stichting Gemini Ziekenhuis	Den Helder		1		1	1				1
57	Stichting BovenIJ Ziekenhuis	Amsterdam		1		1	1				1
58	Stichting 'T Lange Land Ziekenhuis	Zoetermeer		1		1	1				1
59	Stichting Ruwaard van Puttenziekenhuis	Spijkenisse		1		1	1				1

Nr.	Name of hospitals	Place	Top-clinical hospitals	General hospitals	Mixed hospitals	Other hospitals	Randstad	Outside the Randstad	Large hospitals	Middle hospitals	Small hospitals
60	Stichting Ziekenhuis Amstelland	Amstelveen		1		1	1				1
61	Havenziekenhuis en Instituut voor Tropische Ziekten B.V.	Rotterdam		1		1	1				1
62	Stichting het van Weel-Bethesda Ziekenhuis	Dirksland		1		1	1				1
63	Stichting Gelre Ziekenhuizen	Apeldoorn		1		1		1	1		
64	Stichting Ziekenhuisgroep Twente	Almelo		1		1		1	1		
65	Stichting Ziekenhuis Gelderse Vallei	Ede Gld		1		1		1		1	
66	Stichting Ziekenhuis Bernhoven	Oss		1		1		1		1	
67	Stichting Flevoziekenhuis	Almere		1		1		1		1	
68	Stichting Slingeland Ziekenhuis	Doetinchem		1		1		1		1	
69	Stichting Christelijk Algemeen Ziekenhuis Noordwest-Veluwe	Harderwijk		1		1		1			1
70	Stichting Laurentius Ziekenhuis Roermond	Roermond		1		1		1			1
71	Ommelander Ziekenhuis Groep	Delfzijl		1		1		1			1
72	Stichting Antonius Ziekenhuis Zuidwest-Friesland	Sneek		1		1		1			1
73	Interconfessionele Stichting Gezondheidszorg Rivierenland	Tiel		1		1		1			1
74	Stichting Oosterscheldeziekenhuizen	Goes		1		1		1			1
75	Stichting IJsselmeerziekenhuizen	Lelystad		1		1		1			1
76	Stichting Ziekenhuis De Tjongerschans	Heerenveen		1		1		1			1
77	Stichting Ziekenhuis "Nij Smellinghe"	Drachten		1		1		1			1
78	Stichting "Ziekenhuis Walcheren"	Vlissingen		1		1		1			1
79	Stichting Wilhelmina Ziekenhuis Assen	Assen		1		1		1			1
80	Streekziekenhuis Koningin Beatrix	Winterswijk		1		1		1			1
81	Stichting voor Medische en Verpleegkundige Zorgverlening St. Jans Gasthuis	Weert		1		1		1			1
82	Stichting Christelijk Ziekenhuis "Refaja" Stadskanaal	Stadskanaal		1		1		1			1