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PERFORMANCE AND JSE LISTING OF SELECTED SOUTH AFRICAN HOSPITAL OPERATORS

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Abstract

The study investigates the relationship between the Johannesburg Stock Exchange Listing Status and performance of selected South African private Hospital Operators covering a 10-year period from 2008-2017. The selected proxies for the hospital performance measured were: Total Annual Revenue, Revenue per Bed per Day, Total Number of Hospital Beds, and EBITDA margin while controlling for Healthcare Inflation and Medically Insured Population, respectively. The specified regression equation was expanded to include simultaneous equations for the proxies of hospital performance. From this system of simultaneous equations, the study estimated the panel regression model using Seemingly Unrelated Regression (SUR).

The findings showed that (1) JSE-listed Hospital Operators command higher Total Annual Revenues generated, superior Hospital Bed Numbers, and higher Revenue per Bed per Day compared to their unlisted peers, but their operating efficiency is not superior to that of their unlisted peers. In addition, the study found (2) a positive and statistically significant relationship between JSE Listing Status and Private Hospital Operator Performance for the performance proxies of Total Annual Revenue, Revenue per Bed per Day and Total Number of Hospital Beds, but a positive statistically insignificant relationship in respect of EBIDTA margin, the operating efficiency measure of performance; (3) a positive statistically significant relationship between Medically Insured Population and Private Hospital Operator Performance for the performance proxies of Total Annual Revenue, Revenue per Bed per Day, Total Number of Hospital Beds, but a positive statistically insignificant relationship in respect of the operating efficiency measure of performance; (4) a negative statistically insignificant relationship between Healthcare Inflation and Private Hospital Operator Performance for the performance proxies of Total Annual Revenue, Revenue per Bed per Day, Total Number of Hospital Beds, but a positive also statistically insignificant relationship in respect of the operating efficiency measure of performance. These results corroborate the theoretical predictions and are supported by previous studies. The study has important implications for public bourse listing as a strategic organisational consideration in terms of funding mobilisation for corporate performance and growth strategy. The sizeable macroeconomic contribution of the private hospital sector, and the importance of the medical insurance-private hospital performance nexus, behoves policy makers to ensure that the proposed universal health fund in South Africa must not totally crowd out the development of private health insurance.

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Dedication

I give first praise to Jehovah God for all that I accomplish.

This work I dedicate to my first teacher, being my late father, Tshawe Benjamin Mokgatle; to my first guide in life, being my late brother Tshepo Kennedy Mokgatle, and to my angel guardian, being my late aunt, Mmasetshedi Percinah Mokgatle.

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List of Acronyms and Abbreviations

AFS	Annual Financial Statements
AHS	American Hospital Association
BBBEEA	Broad-Based Black Economic Empowerment Act
BEE	Black economic empowerment
Beneficiaries	Principal members + dependents (total membership of medical scheme)
BHF	Board of Healthcare Funders of Southern Africa
CAGR	Compound Annual Growth Rate
CC	Competition Commission
CMS	Council for Medical Schemes
CPI	Consumer Price Index
CT	Computerised Tomography scans
DDDR	Dynamic Database Driven Annual Returns
Dependent	Member not responsible for paying contribution(s) to medical scheme; depends on principal member for membership
DHMS	Discovery Health Medical Scheme
DoJ	United States Department of Justice
DRC	Dispute Resolution Committee
DRG	Diagnosis Related Group
EE	Employment equity
EU	European Union
FFS	Fee for service
FTC	Federal Trade Commission (US)
GDP	Gross Domestic Product
GEMS	Government Employees Medical Scheme
GHE	Government Health Expenditure
GP	General practitioner
HHI	Herfindahl-Hirschman Index
HMG	Horizontal Merger Guidelines of the USA DoJ
HMI	Health Market Inquiry
ICU	Intensive care unit
IPO	Initial Public Offering
ISBN	International Standard Book Number

JSE	Johannesburg Stock Exchange
ListCo	A company listed on the Johannesburg Stock Exchange
LoS	Length of (admission) Stay
MRI (scan)	Magnetic resonance imaging
MSA	Medical Schemes Act
MSE	Medical Scheme Expenditure
NDoH	National Department of Health
NFP	Not-for-Profit
NHI	National Health Insurance
NHS	National Health Services (UK)
OECD	Organisation for Economic Co-operation & Development
OOP	Out-of-pocket (expenditure)
PFI	Private Finance Initiative
PPI	Public Private Partnership
PvtHE	Private Health Expenditure
SMME	Small and Medium Enterprise
TGE	Total Government Expenditure
THE	Total Health Expenditure
StatsSA	South African National Statistical Services
SUR	Seemingly Unrelated Regression
US	United States of America
UK	The United Kingdom
White Paper	White Paper on the NHI by the National Department of Health

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The South African Private Hospital Sector is arguably the most developed and sophisticated of all African countries and has proven itself to be world-class as evidenced by the Johannesburg Stock Exchange ("JSE") listed local operators' expanding international footprint. This has seen developed markets operations spanning the United Kingdom and Switzerland, and an emerging market footprint that straddles both regional (Botswana, Lesotho, Namibia) and international (the United Arab Emirates, and India) markets. With a reported 91 050 total public sector beds in South Africa (Day, Gray, & Ndlovu, 2018), the total private health sector licensed bed number of 40 514 (Econex, 2017, p. 4) constitutes approximately 30% of the calculated total National Hospital Bed Count of 131 573. Whilst South Africa had 524 private healthcare facilities with 40 514 beds in 2017, there were around 225 private acute multi-disciplinary hospitals and 88 private acute day hospitals, making up a total of 313 private acute hospitals. These private acute hospitals, in turn, and in terms of licensed beds, accounted for 35 300 beds, being 34 021 acute multi-disciplinary beds and 1 279 acute day beds, respectively (Econex, 2017, p. 4). These acute private hospitals – excluding rehabilitation facilities, mental health facilities and sub-acute private hospitals – delineate and define, for the purposes of our study, the private acute hospital segment ("Private Acute Hospital Sector").

The national economic importance of the private healthcare market ("Total Private Healthcare Market") cannot be underemphasised. The South African Total Private Healthcare Market, in terms of expenditure, was calculated in 2015 to be about $11.9 billion and representing around 4,6% of the nation's gross domestic product (Health Policy Project, 2016). The Council for Medical Schemes reported in its 2018 annual report that 15,7% of the national population was covered by the private health insurance expenditure in 2017 (CMS, 2018). Private hospitals remain an important component of the Total Private Healthcare Market, and the sectoral importance of the private hospital sector is underscored by its economy-wide impact across all sectors, with a 1.28% contribution to GDP and 1.57% to employment, respectively (Econex,

2017, p. 12). Dissecting the private hospital sector further, it is instructive to note that the JSE-listed hospital operators in South African, namely, Netcare Holdings ("Netcare"), Life Healthcare Group ("Life") and Mediclinic International ("Mediclinic") account for the majority of the total private Hospital Beds in South Africa. Netcare commands 28%, Life has 23% and Mediclinic accounts for a 22% share of the private hospital bed count. This implies that these three listed operators comprise an oligopolistic structure to the private hospital sector, accounting for 73% market share in terms of registered private Hospital Beds. This JSE-listed private hospital operator oligopoly, pejoratively referred to as the "Big 3" in South Africa, has witnessed positive growth in the past ten years to 2017 to reach a combined market capitalization of $12,5 billion, representing 1,2% of the total JSE market capitalization (JSE Limited, 2017). Such has been the growth and performance of the three JSE Hospital Operators that they are in the Largest Forty Companies on the JSE by market capitalization, with Mediclinic's market capitalization the largest at US$5,9 billion, followed by Life's US$3,4 billion, and Netcare not far behind at US$3,1 billion (JSE Limited, 2017).

Against the background of the financial performance and growth of the JSE-listed South African private Hospital Operators, and given that the increase in medical prices has been consistently running ahead of the consumer price index ("CPI") over the past decade (Erasmus & Fourie, 2014, p.1), this contributed to the formal commissioning of a private hospital enquiry in 2014 by the South African anti-trust watchdog, the Competition Commission South Africa (the "Competition Commission") in terms of "Chapter 4A of the Competition Act, 89 of 1998, as amended (RSA Government Gazette, 2013). The Competition Commission's stated rationale for the institution of an enquiry into the South African private health sector (the "Health Market Inquiry" or the "HMI") was that it had "reason to believe that there are features of the South African private healthcare sector that prevent, distort or restrict competition" (Competition Commission, 2014). It is, however, important to highlight that, although private hospitals – and in particular the listed private Hospital Operators – account for the lion's share of the private healthcare market, the Health Market Inquiry was fundamentally a more general market investigation into the structure of the South African private healthcare market (CMS, 2013, p. 27), being "the state, nature and form of competition in a market, rather than a narrow investigation of a specific conduct by any particular firm" (Competition Commission, 2014).

1.2 STATEMENT OF THE PROBLEM

South Africa is a country with a severely undercapitalised public health sector, finding itself at the early stages of crafting a National Health Insurance Fund to afford its largely uninsured, and mostly lower-income citizenry, a form of public universal health coverage (NDoH, 2017). However, it has one of the most developed global-standard private hospital sectors with all three South African JSE-listed private Hospital Operators having expanded their operations globally: Netcare in the United Kingdom (Netcare Limited, 2017), Mediclinic in Switzerland and the United Arab Emirates (Mediclinic, 2017), whilst Life Healthcare has interests in India (Life Healthcare, 2017).

Against this backdrop of globally competitive private Hospital Operators, on the home front, however, an increasing burden of disease associated with a growing middle class, an oligopolistic private hospital sector, and healthcare inflation chronically surging ahead of core inflation has raised the attention of the anti-trust regulators. Whilst the Competition Commission's inquiry points to the possibility of abuse of market dominance and "identified potential sources of harm to competition, which include market power, barriers to entry and expansion into a market, imperfect information and the regulatory framework" (Competition Commission, 2014, p. 5), in the case of private hospitals, and in particular that of the oligopoly incumbents of the JSE-listed Hospital Operators, it remains unclear what the factors contributed to the attainment of their dominant position. This issue deserves to be empirically probed to provide a better understanding of the causes of market dominance and the potential role of stock exchange listing in influencing the competitiveness of Hospital Operators in South Africa.

To the extent that a not inconspicuous distinction between the dominant oligopoly incumbents represented by Netcare, Life and Mediclinic and the remainder unlisted competitors is the JSE Listing Status, and taking into account that the JSE, with a market capitalization of US$995 billion (adjusted US$ as at March 2017) is the world's 17th largest stock exchange by market capitalization and the largest stock exchange in Africa (JSE Limited, 2017), the study aims to investigate the extent to which the status of being listed on the JSE may impact the competitiveness of JSE-listed private Hospital Operators over their unlisted peers.

This study, therefore, addresses the question: how has listing on the Johannesburg Stock Exchange conferred competitive advantage to the JSE-listed Hospital Operators over their unlisted peers in the long run?

The Key Research Question, therefore, is:

Is there a relationship between listing on the JSE and the financial performance of South African Hospital Operators?

1.3 RESEARCH OBJECTIVES

The study fundamentally seeks to explore the impact of JSE listing on the long-term competitiveness of South African Hospital Operators. Specifically, the objective of the study is to: -

Investigate the impact of JSE listing on the financial performance of selected South African Hospital Operators.

1.4 HYPOTHESES OF THE STUDY

The research study will test the following hypotheses:

H_o: There is no positive relationship between listing on the JSE and the financial performance of selected Private Hospital Operators

H_1: There is a positive relationship between listing on the JSE and the financial performance of selected Private Hospital Operators

1.5 JUSTIFICATION OF THE STUDY

In the main, the unlisted South African private hospital operator market has largely been South Africa's lower-income, yet medically insured, previously under-serviced urban development markets, the majority of whom are historically Black communities. From a development finance point of view, the motivation of the study is the seeming inability to attract private equity, real estate finance and debt funding in private hospital infrastructure projects and investments by the unlisted private Hospital Operators to fuel their growth.

Therefore, the relevance of the study's findings for both established and emerging private Hospital Operators, project finance practitioners (both project originators and sponsors), health sector institutional investors (both listed and private equity), specialised health sector real estate investment trusts, development finance institutions, and other stakeholders is the elucidation of the institutional and contextual factors for growth and competitiveness in the South African private hospital sector. This, in turn, influences critical investor decision-making about funding mobilisation and returns in these urban growth and developing markets. The study will provide the needed data and insights critical for strategic managerial purposes and seeks to confer a better understanding of optimal long-term organisational funding sources to support corporate performance and growth strategies, especially for the emerging private Hospital Operators in South Africa.

1.6 STRUCTURE OF THE STUDY

The organisation of this paper is as follows: Chapter 1 introduces the theme of the study, expounding on the problem to be investigated, the background to the study and contextualising the key research questions. Chapter 2 of the study provides an overview of the Private Hospital market in South Africa as a foreground to the literature review. The following Chapter 3 undertakes a comprehensive literature review whose main output is to outline the theoretical and empirical considerations informing the study's line of scientific enquiry. It also aims to elucidate the positioning of the study within the broader canvass of the discipline of development finance. The literature review ushers in the methodology of the research study, being Chapter 4, which outlines the "how" of the study by identifying the chosen research tools to analyse the research problem in question, being the impact of JSE listing on the competitiveness of JSE-listed South African Hospital Operators. Chapter 5 - Data Analysis provides the analysis and interpretation of the same results. Finally, the study concludes with

Chapter 6 wherein the main findings of the study are summarised, discussing managerial implications of the results, and offering recommendations for future areas of research.

CHAPTER TWO

OVERVIEW OF THE PRIVATE HOSPITAL MARKET IN SOUTH AFRICA

2.1 INTRODUCTION

Chapter 2 provides a brief overview of the Private Hospital market in South Africa including its levers for growth. The chapter is organised into the following sub-sections: Sub-section 2.2 discusses the structure of the market highlighting the number of players, the concentration patterns in terms of markets shares, and the dichotomy by Listing Status; sub-section 2.3 provides an overview of the role of the state both as a market participant and provider of an enabling environment; sub-section 2.4 highlights the critical drivers of growth in the market. Sub-section 2.5 concludes by summarising the chapter.

2.2 STRUCTURE OF THE MARKET

2.2.1 Competitive Landscape

The South African Private Hospital sector comprised 40 514 registered Hospital Beds and 524 facilities in 2016/17 (Econex, 2017, p. 63). The private hospitals belong to two major hospital lobby groups, the Hospital Association of South Africa (HASA) which comprises mainly the JSE-listed hospital groups, and a bargaining group of independent unlisted private Hospital Operators called the National Health Network (NHN).

Considering each of the listed private hospitals groups on a stand-alone basis makes the NHN group the largest hospital "grouping" (not a distinct corporate group but an aggregate grouping as the NHN does not own its affiliate hospitals) in South Africa in terms of bed numbers and the number of facilities. A fragmented group of private hospitals comprising the remainder of hospitals belonging to neither the NHN nor HASA make up a significantly large share of hospital facilities (27%) but account for a relatively smaller proportion of beds (8%), indicating that this grouping comprises generally smaller facilities in terms of beds per facility. Collectively the three JSE-listed hospital groups belonging to HASA – Life Healthcare,

Mediclinic, and Netcare – collectively command the majority 66% market share in terms of beds (Econex, 2017).

Table 1: Number and Share of Private Hospital Beds in South Africa (2017)

Hospital Chain/ Grouping	Beds (#)	Beds (%)
Netcare	10 088	25%
Life Healthcare	8 636	21%
Mediclinic	8 007	20%
NHN	10 228	25%
Other-Not HASA	3 105	8%
Other-HASA	450	1%
Total Private Beds	**40 514**	**100%**

Source: Econex (2017)

Table 2: Number and share of private hospital facilities in South Africa (2017)

Hospital Chain/ Grouping	Hospital Facility (#)	Hospital Facilities (%)
Netcare	57	11%
Life Healthcare	64	12%
Mediclinic	51	10%
NHN	208	39%
Other-Not HASA	140	27%
Other-HASA	4	1%
Total Private Beds	**524**	**100%**

Source: Econex (2017)

Private Hospital Beds in South Africa are split roughly eighty percent to acute multi-disciplinary hospitals, and the remainder among non-acute hospital facilities. Same-day surgery hospitals, called "Day Hospitals" in South Africa, make up only 3% of Hospital Beds, highlighting the major skew towards in-patient care. The remainder of the private beds, roughly twelve percent, are split between Mental Health Institutions—which is the second largest group (5%), Sub-acute facilities (4%), Drug and Alcohol Rehabilitation (2%), Ophthalmology (1%), and Private Rehabilitation Facilities (1%), respectively.

Table 3: Distribution of Private Hospital Facilities by Licensed Beds in South Africa (2017)

Hospital Chain/ Grouping	Hospital Facility (#)	Hospital Facilities (%)
Acute Hospitals	34021	84%
Day Hospitals	1279	3%
Mental Health Institutions	2160	5%
Sub-Acute Facilities	1761	4%
Drug & Alcohol Rehab	664	2%
Acute Private Rehab	356	1%
Ophthalmology	272	1%
Unattached Operating Theatre	1	0%
Total Facilities	40514	100%

Source: Econex (2017)

2.2.2 JSE-listed Hospital Operators

The listed private hospital groups' combined share of the total private hospital market has declined marginally over the past six years from 71% to the present majority of 66%. In the same period, however, the total combined bed number has increased by 4,2% from 25 644 to 26 731. The achieved two-year bed compound annual growth rate (CAGR) of 2.1% was led by Netcare's CAGR of 2,6%, with the lowest growth shown by Mediclinic at 1,5%. Netcare has the largest number of beds (10 088), followed by Life Healthcare (8 636), and Mediclinic (8 007) the lowest. In terms of hospital facilities, Life Healthcare commands the lead with 64 facilities, Netcare with 57, and Mediclinic with the lowest number at 51 facilities (Econex, 2017).

Table 4: Licensed Listed Private Hospital Beds in South Africa (2014/5 -2016/7)

Listed Hospital Group	Beds 2014/5	Beds 2015/6	Beds 2016/7	2yr CAGR
Netcare	9 588	9 922	10 088	2,6%
Life Healthcare	8 286	8 515	8 636	2,1%
Mediclinic	7 770	7 955	8 007	1,5%
Total Listed Private Beds	**25 644**	**26 392**	**26 731**	**2,1%**

Source: Econex (2017)

2.3 STATE PARTICIPATION IN THE MARKET

2.3.1 Health Services Provision and Population Insurance Coverage

Of the total South African population of 56,52 million in 2017 (StatsSA, 2018) only a total 8 872 036 of the population is covered by private medical insurance according to the Council for Medical Schemes' total beneficiaries numbers for 2017 (CMS, 2018). Therefore, it can be inferred that the private health system in South Africa serves 15,7% of the population, whilst the public health system caters for the remainder, and majority, 84,3%.

2.3.2 State Expenditure on Healthcare

KPMG South Africa (2011) attest to the fact that South Africa's public expenditure on healthcare, measured in terms of public health expenditure as a percentage of total government expenditure at 3.41% in 2009, is comparable with similar developing nations such as Brazil and Russia, but higher than China's. However, when measured in terms of per capita healthcare spending, South Africa reveals poor comparability, and this lagging behind is "significant in comparison to countries with existing national health security systems, such as Australia and the United Kingdom" (p. 10).

Table 5: Comparison of National Healthcare Expenditure

Country	Public Expenditure on health as % of GDP			Public Health expenditure as a % of total Government expenditure			Public health expenditure per capita PPP (constant 2005 prices, US$)		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Australia	5.56	5.56	5.56	17.10	17.10	17.10	2 190.4	2 200.6	2 211.9
Brazil	3.51	3.72	4.13	5.37	5.96	6.08	342.13	385.33	430.8
Canada	6.70	6.84	7.50	17.11	17.19	17.01	2 573.5	2 688.4	2 882.9
China	1.92	2.05	2.29	10.27	10.27	10.27	106.13	125.6	155.04
India	1.21	1.35	1.37	4.06	4.41	4.06	33.48	39.51	43.14
Russia	3.45	3.10	3.51	10.21	9.17	8.53	580.9	633.3	668.7
South Africa	3.45	3.27	3.41	11.06	10.39	9.27	336.72	334.4	345.7
United Kingdom	6.91	7.16	7.81	15.65	15.12	15.12	2 465.2	2 662.2	2 842.6
United States	6.97	7.26	7.88	19.00	18.73	18.68	3 239.5	3 425.9	3 602.4

Source: World Development Indicators (adapted from KPMG SA, 2011).

2.3.3 The National Health Insurance ("NHI")

The South African National Department of Health's ("NDoH") stated policy position is to introduce its proposed National Health Insurance in a phased manner over a 14-year period to provide universal health coverage to all South Africans, to improve health outcomes for all, and to guarantee equitable access to healthcare to all nationals irrespective of their employment status or ability to pay (National Department of Health, 2012). The NHI programme will require massive investment in the public healthcare infrastructure to bring about the desired improvement in the public health facilities' quality of service. The funding of the NHI programme will largely be sourced from general taxes, meaning that citizens earning more will contribute proportionately more to the NHI (National Department of Health, 2012). However, the design and financing of the NHI, with a projected expenditure of ZAR256 billion in the fiscal year 2025/26, according to the gazetted NDoH White Paper on NHI (National Department of Health, 2017), are still to be finalised, raising concerns among stakeholders about the affordability of the NHI programme. Theron, Erasmus, van Lill, van Niekerk and Rich (2016) have suggested that the NHI programme, as presently framed, is based on overly optimistic GDP growth (White Paper forecast growth of 3.5% per annum versus the IMF's forecast of just under 1%), and this may not be achievable as it is likely to require greater funding than what the fiscus can afford. Essentially, Theron et al. (2016) point out that an overly ambitious sustained annual health budget increment of 10.6% from 2019/20 (in 2010 terms) would be required to achieve the forecast NHI expenditure budget of R256 billion in 2025/26.

2.3.4 Regulation and Competition in the Private Health

The Competition Commission instituted an inquiry into probable uncompetitive behaviour in the South African private healthcare sector due to, inter alia, a divergent trend observed where health inflation consistently outstripped historical headline inflation. Also, increasing Medical Schemes contributions was accented to be the main concern for the Competition Commission as the deemed underpin to price increases in the private health sector (Erasmus & Fourie, 2014). However, these researchers posit two critical points for consideration in the analysis of price increases. First, that that there is a difference between Health Inflation and Medical Scheme contributions increases. Secondly, that healthcare inflation above headline inflation is not, per se, indicative of anti-competitive behaviour or market irregularities, but that the key question

and focus of the Competition Commission should be an interrogation of whether the price increase trends witnessed are driven by "legitimate increases in input costs, demand and supply dynamics or by anti-competitive behaviour" (p. 6).

2.4 LEVERS OF GROWTH

2.4.1 Structural Levers

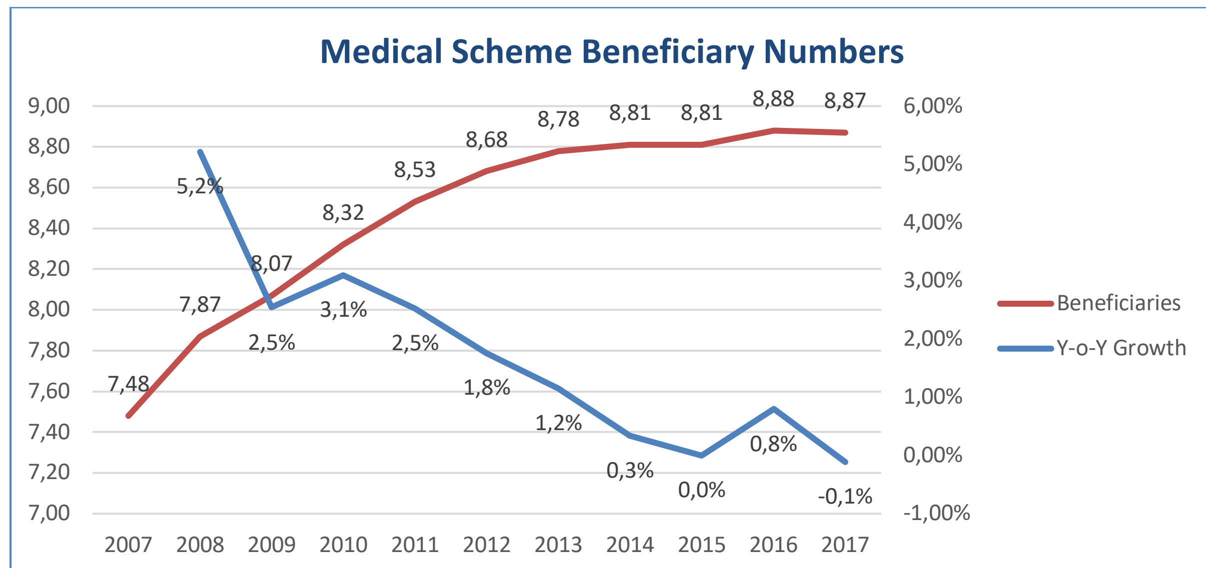
South Africa has a growing middle class, a high burden of disease and an increased prevalence of chronic non-communicable diseases. These socio-epidemiological and structural features have been posited as fuelling demand for healthcare (National Department of Health, 2017). However, certain structural challenges pose real headwinds on the private healthcare sector, inter alia, poor access to healthcare and unaffordability of healthcare, these in an emerging economy characterised by anaemic economic growth, limited fiscal space due to a constricted tax base, high levels of unemployment, and inequality punctuated by elevated levels of poverty (Mediclinic, 2016). These economic headwinds faced by South Africa, Mediclinic contends in the same report, also negatively affect the private health insurers (called Medical Schemes in South Africa), therefore, having a follow-through effect on the private healthcare sector which is funded mainly through Medical Schemes (Mediclinic, 2016).

2.4.2 Medical Schemes and Private Health Expenditure

Medical "Insurers" are institutional private healthcare services purchasers and are called Medical Schemes in South Africa as they are neither governed by the Short Term Insurance Act of 1998 (Act 53 of 1998) nor the Long Term Insurance Act of 1998 (Act 52 of 1998), hence they are not legally defined as a medical insurer but are regulated under the Medical Scheme Act of 1998, number 131 of 1998 (RSA Government Gazette, 1998). This means they operate as non-profit organisations governed by a board of trustees on behalf of members, paying no dividend, and with all surpluses invested for the benefit of members (Discovery, 2020). The bargaining power of Medical Schemes – or rather that of Medical Scheme Administrators who are contracted purchasers of private healthcare services on behalf of Medical Schemes – has increased in recent times due to consolidation in the market. As the table below reflects, at the same time, according to the South African Council for Medical Schemes, the Medical Schemes regulator, demand is facing constraint due to the decline in membership growth of Medical

Schemes, as measured by the decline in the number of new covered lives from 3,1% in 2010 to 0,4% in 2014 (CMS, 2018).

Graph 1: Medical Scheme Beneficiary Numbers



Source: Council for Medical Schemes (2018).

In 2015, according to Health Policy Project (2016), about half (49.8%) of Total Health Expenditure (THE) in South Africa was funded by the Private Healthcare Sector (PvtHE), the other half financed mainly by Government Health Expenditure (GHE) at 48.4%, whilst a small fraction of 1.9% is health expenditure funded by donors. The Pooled Private Health Expenditure, therefore, accounted for 51.7% of Total Health Expenditure. A majority 83.5% of Private Health Expenditure, in turn, is funded by Medical Scheme Expenditure (MSE), whilst Out-of-Pocket Expenditure (OOP) comprised 13% of PvtHE (Health Policy Project, 2016). Medical Scheme Expenditure on private hospitals in South Africa, therefore, serves as a useful proxy for private hospital revenues.

2.4.3 Care Fragmentation

"Care is fragmented with private hospitals providing patients with facilities such as wards, theatres and nursing care while doctors and allied healthcare professionals provide services to patients within the hospitals but are financially independent, making co-ordination of care sub-optimal" (Mediclinic, 2016, p. 16).

2.4.4 Human Capital Constraints

Mediclinic, a private hospital operator in South Africa highlights that South Africa faces a dire shortage of skilled resources, but especially so in healthcare with only 77.6 doctors per 100 000 lives which is approximately half the global average of 152 per 100 000 lives, and 403 nurses per 100 000 lives, again lower than peer developing countries (Mediclinic, 2016). This specialised healthcare skills shortage, Mediclinic contends, is worsened by competition with the local public healthcare sector and exacerbated by the phenomenon of global healthcare human capital recruitment of South African medical professionals.

2.4.5 Regulatory Changes: National Health Insurance

As already stated, the South African National Department of Health seeks to implement the NHI in a phased introduction over 14 years; however, the financing and design of the NHI are still to be finalised. There are presently heated debates about the affordability of the NHI programme, with researchers Theron, Erasmus, van Lill, van Niekerk & Rich (2016) suggesting that the proposed NHI programme is ambitious and will likely require greater funding than forecast as its financing estimates are based on overly optimistic GDP growth assumptions

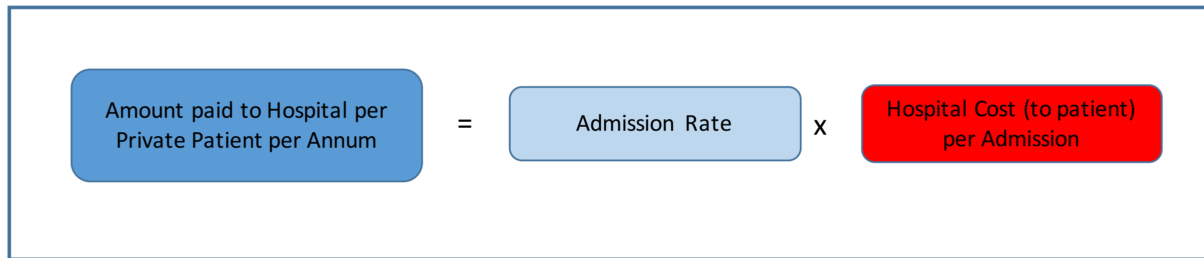
2.5 DRIVERS OF PRIVATE HEALTHCARE (HOSPITAL) COSTS

2.5.1 Framework of the Drivers of Private Hospital Cost

All the aforesaid levers of growth interact in a complex and dynamic ecosystem that informs the amounts paid to hospitals per annum, being the total annual revenues. Whereas the total annual revenue may be a gross reflection of size and scale, that is hospital bed numbers, adjusting total annual revenue for total bed numbers and unitising the resultant measure in days gives a more granular view of the ability of the hospital operator to extract maximum revenue (value) per given patient admission per day.

Ultimately, the total amount (revenues) paid to a hospital, and reciprocally, the hospital cost borne by the patient pool, is a function of the Admission Rate and Hospital Cost of Admission to the Patient, as per the graphic below.

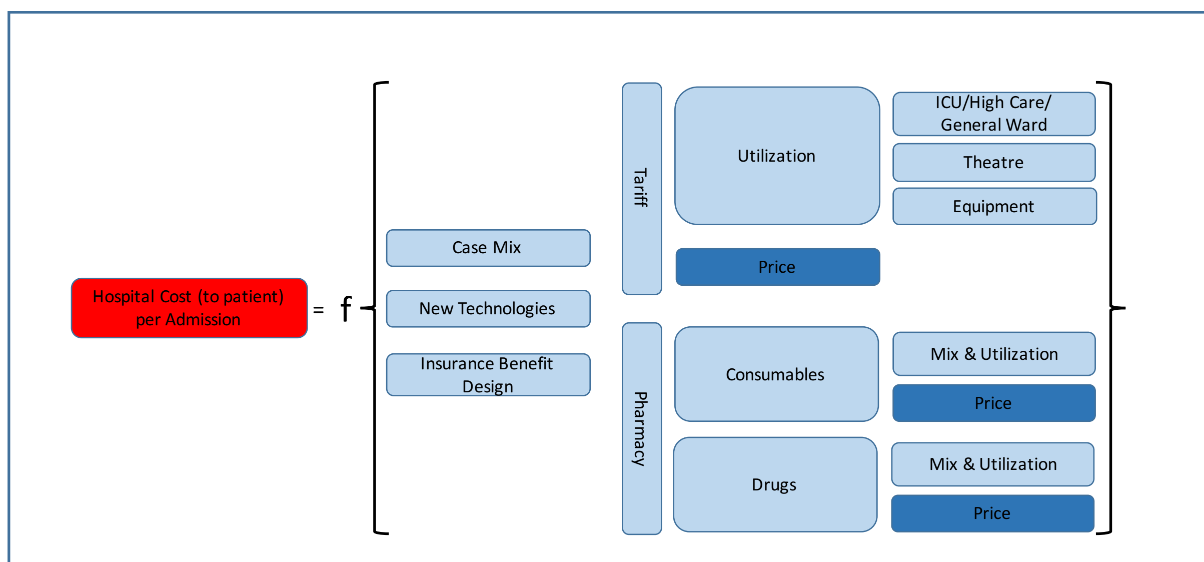
Figure 1: Amount paid to Hospital per Private Patient per Annum



Source: (Insight Actuaries, 2014)

Further, the drivers of the hospital cost of admission to patient are multifactorial and price is but one of the factors as illustrated and summarised in the graphic below adapted from Insight Actuaries & Consultants (Insight Actuaries, 2014).

Figure 2: Hospital Cost per Admission Patient



Source: (Insight Actuaries, 2014)

A complex macro environment of case mix (itself multifactorial and encompassing various epidemiological factors and burden of disease, etc.), use of medical technology, and the medical insurance coverage (benefit design and breadth of insurance cover) form the backdrop against which bed tariff and pharmacy costs drive the cost of hospital admission to the patient. Evidently, price is an important factor that drives the composite bed tariff, but this is a function of utilisation of especially high-cost services in ICU, high care wards, operating theatres, and use of costly surgical equipment. Further, utilisation of pharmacy consumables and drugs factored against price drives pharmacy expenditure profile (Insight Actuaries, 2014).

2.5.2 Hospital Price Inflation and Volume of Care

A study by Erasmus and Kean (2018) on the drivers of private healthcare costs in South Africa over a nine-year period to 2014 investigated determinants of medical scheme expenditure on private hospitals, focusing specifically on the relationship of these drivers to the variables of volume of care and price of care, and using mainly data from the three JSE-listed Hospital Operators. To improve the robustness of their analysis, Erasmus & Kean (2018) decomposed their data to account for headline inflation in the general economy, and underlying growth in Medical Scheme beneficiaries (p. 3). Their finding was contrary to previous assertions by some industry stakeholders that price inflation was the only driver of Medical Scheme expenditure on private hospitals. They found the general private hospital price increases over the research period to have largely been in line with the South African economy's general price increase and that the increasing Medical Scheme expenditure on private hospitals was actually multifactorial, "with price increases being fairly benign" (p. 14) and averaging only 0.8% points above core inflation over the period 2003 to 2013. Erasmus & Kean (2018) concluded, therefore, that it is incorrect to solely attribute increasing Medical Scheme private hospital expenditure to hospital price inflation, but that increasing utilisation is the primary driver of costs. Utilisation is driven by an increased admission rate, a longer average length of stay in hospital, which factors are in turn driven by an ageing insured population and rising burden of non-diseases of the insured population (p. 13).

Further, research by Discovery Health, South Africa's largest Medical Scheme by principal members ensued (CMS, 2018). This formed part of a 2016 submission to the Health Market Inquiry and showed that data from several industry stakeholders (including other Medical Schemes Administrators, JSE-listed Hospital Operators, and healthcare economics research houses, etc.) indicates that it is increasing utilisation of services by Medical Scheme members (privately insured population) that is the key driver of Medical Scheme cost inflation, whilst private hospital price tariff increases, in fact, track CPI very closely (Discovery, 2016). Over the period 2008 to 2015 of the 11.3% annual increase in Medical Scheme expenditure on private hospitals recorded, 6.7% was attributable to headline inflation, 4.2% to increase in utilisation, and only 0.4% was due to hospital tariffs and prices exceeding core inflation (p. 14).

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

The chapter provides a brief overview of existing theories underlying issues of competitive markets, public goods, competition and anti-trust theory, agency and capital structure theory. The chapter then segues to the review of the existing body of literature on the evolution of the corporatisation and privatisation of healthcare markets, the funding-provision interface, capital sources of healthcare financing, the role of non-profit private hospitals, patient choice, performance and ownership form, ownership conversions, going public, and finally public to private transactions. Following the literature review, the chapter closes with a conclusion that highlights the identified knowledge gap and how the research aims to help address the knowledge gap.

3.2 THEORETICAL FRAMEWORK

3.2.1 Healthcare Markets and Competitive Markets

Healthcare Markets departure from Textbook Competitive Markets

Gaynor and Vogt (2000) highlight four critical differences between textbook markets and healthcare markets, being the existence of a differentiated product, imperfect information, government regulation, and a presence of not-for-profit firms, and suggest that these differences, or market imperfections, may affect the optimality of competition in healthcare markets (p. 3). Woolhandler and Himmelstein (2004) in seeking to explain their observation as to why for-profit firms (hospitals) that seemingly "offer inferior products at inflated prices survive in the (healthcare) market, assert that several prerequisites for the competitive free market described in classical economics textbooks are absent in the healthcare market" (p. 1814). Specifically, Rice (as cited in Woolhandler & Himmelstein, 2004) contends that several assumptions resulting in the supposed desirability of competitive markets are typically not fulfilled in the healthcare sector, and hence the recognition that no longer do market mechanisms necessarily offer the best way to optimise social welfare.

Price Transparency is not a Panacea for Efficient Markets

In the presence of high information asymmetry, characteristic of the healthcare sector, providing patients with information about prices of services is expected to improve markets efficiency as it allows patients to more effectively use price in their choice of care (services), with the expected result of lower healthcare spending. However, a study by Desai, Hatfield, Hicks, Chernew, and Mehrotra (2016) suggests that price transparency tools offered to patients are not associated with lowered healthcare spending, as intended.

Volpp (2016) argues that price transparency is not a panacea for patient consumer spending and that in the absence of associated data on quality, patients may assume that higher price means higher quality, hence increase their spending as they search for quality. Also, price transparency tools do not seem to have the intended goal of lowering the rate of consumer healthcare spending, and this could point to the fact that patients do not really function as consumers in the medical markets, as they often rely on their caregivers (physicians) as to which service to use (p. 1842).

3.2.2 Measurement of Healthcare Competition: Private Hospitals Market Concentration

Whilst the focus of the study is not merger analysis, per se, the body of knowledge in international anti-trust law and the associated merger analysis framework informs market concentration analysis, hence stand to afford critical insights into market share and competitiveness in a given market, and directly so in the study's instance in respect of the optimality of competition in the private hospital operator market in South Africa.

Private Hospital Market Concentration Guidelines

Whereas South African Anti-trust Authorities, the Competition Commission of South Africa and the Competition Tribunal, mainly place reliance on market concentration measures encapsulated by the Herfindahl-Hirschman Index ("HHI") threshold as guided by the International Competition Network ("ICN") in their merger guidelines, the Health Market Inquiry, in their assessment of market concentration in the South African Hospital Operator Market, chose to rely on HHI threshold as articulated by the US Department of Justice and Federal Trade Commission (Department of Economic Development, 2019, p. 69). In

comparison to the US Department of Justice and Federal Trade Commission, the lower HHI concentration thresholds employed by the ICN for determining unconcentrated markets, moderately concentrated markets, and highly concentrated markets, respectively, would imply more stringent mergers and concentration guidelines by the ICN. The table below summarises the HHI concentration thresholds of the ICN and the US Department of Justice and Federal Trade Commission, respectively.

Table 6: Herfindahl-Hirschman Index of Concentration Threshold

	ICN	US DOJ & FTC
Un-concentrated Markets	<1000	<1500
Moderately Concentrated Markets	1000 - 2000	1500 - 2500
Highly Concentrated Markets	>2000	>2500

Source: Horizontal Merger Guidelines (as cited in Department of Economic Development, 2019).

Measurement of the HHI Market Concentration

The US Department of Justice ("DoJ") and Federal Trade Commission's ("FTC") Horizontal Merger Guidelines (USA Department of Justice, 2010) define the HHI of market concentration as the sum of the squares of the incumbent firms' market shares, with an HHI score of 10 000 for a pure monopoly and a number that approaches zero (0) for an atomistic market (p. 11). The formulation of the HHI in its calculation of market concentration implicitly confers proportionately higher weighting to larger market shares.

Even in the ambit of deciding the merits of the legality of the merger in the United States of America under the Clayton Act (Section 7 of the Clayton Act) or the Sherman Act (Section 1 and 2 of the Sherman Act) (as cited in Gaynor and Vogt, 2000), the computation of the HHI is not a stand-alone step but a component of a robust and formalised legalistic process. Instructively, Gaynor and Vogt (2000) point out that the courts, along with the enforcement agencies in the United States, employ a six-step sequence entailing an initial three steps of the "definition of the relevant product market, the definition of the relevant geographic market, and then the identification of the competitors in the relevant product/geographic market". It is,

therefore, only after identification of competitors in the relevant market that the fourth step can be proceeded to. In the fourth step, competitors' market share and the market concentration index, in the form of the HHI, are then calculated. The two final steps delve into actual merger analysis, which is beyond the scope of this study, and entail the fifth step of the calculation of the post-merger variables of the resultant market share and post-merger HHI, and the analysis of the potential effect of the merger on competition. The final sixth step encompasses the evaluation of any risks and potential mitigants to anti-competitive effects from the proposed merger. However, these authors acutely highlight that the lack of consensus surrounding the "proper" market share variable remains a challenge in hospitals merger analysis but that notwithstanding this ambiguity, the choice of market variable which may include, inter alia, Total Revenues, In-patient Revenues, Bed Numbers, Admissions, and Patient-days, seems not to fundamentally impact calculations outcomes.

Hospital Merger Analysis

Although merger analysis is beyond the scope of this study, we give a precis of literature review on hospital mergers as a logical conclusion to our market concentration exposition above, drawing mainly on the United States experience which holds a rich body of literature on the subject. A further search of the literature on hospital mergers points once more to the erudite summary of the literature on hospital mergers conducted in the same work of 2010 referenced above by Gaynor and Vogt (2000) and whose most salient points in respect of the USA market are expounded hereunder. Gaynor and Vogt point to the consensus that some scale economies are found to exist for small hospitals and that various studies (Cowing, Holtmann, & Powers, 1983) seem to concur on an "average cost curve with a minimum around 200 beds", whilst Dranove and White (1998) in a study of California hospitals also found that at a hospital size as large as 200 beds, economies of scale are typically exhausted. Further, in assessing the effects of a merger on the exercise of power, researchers Connor, Feldman, Dowd and Radcliff (1997) employed a database of 3500 US hospitals and studied 122 hospital mergers occurring over two decades from 1986 to 1994. Connor et al. found loss of social welfare in mergers that occurred in markets that de novo had a higher degree of concentration, as evidenced by the generation of higher price increases, and smaller cost savings compared to mergers in un-concentrated markets. Also, certain other characteristics magnified the anti-competitive effects of these mergers, including high-capacity-utilisation hospitals, fewer duplicative services

(hence lower ability to rationalise) and low managed care penetrations. And finally, in respect of the potential of mergers to lead to increases in oligopoly power, Connor et al. (1997) in their research concluded that there was no strong evidence to support this view.

Finally, Gaynor and Vogt (2000), acutely point to the lack of a firm standard for a threshold of the concentration index, but refer to Horizontal Merger Guidelines and to the United States case law, respectively, where the United States Supreme Court ruled that a market share of 30% post-merger met the threshold for a presumption of illegality of the said merger (p. 12).

Competition in the South African Private Hospital Market

At a national level, using hospital admissions data and registered bed numbers data, and relying on the DOJ & FTC's Horizontal Merger Guidelines (see Table 6 above), the HMI calculated incumbents' market shares and associated HHIs to assess the South African private hospital market concentration levels. Based on hospital admission data, the calculated HHI market concentration measures for the national private hospital market was 2784, and slightly lower at 2521 based on registered beds data, respectively (Department of Economic Development, 2019). Consequently, the HMI arrived at a conclusion that, at the national level, even after comparing their results to the HHI thresholds of the ICN, or those applied by the United Kingdom Competition Authorities, the national private hospital facilities' market in South Africa is highly concentrated (p. 77).

Employing a matrix of different data sets to that of the HMI in calculating the HHI market concentration measures in the national private hospital market, it is instructive to note the findings of the incumbent private hospitals (input from Netcare and Mediclinic, both JSE-listed Hospital Operators) and Discovery Health (South Africa's largest private medical insurer), respectively. As the table below from the final findings of the HMI reveals (Department of Economic Development, 2019), Discovery Health corroborated the HMI's conclusion of a highly concentrated national private hospital market, whilst the submission of the private hospital concluded that only moderate concentration exists at a national level (p. 71).

Table 7: HHI Market Concentration: HMI versus Stakeholders

	HHI Results	Period Considered	Type of Data used to calculate HHI
HMI	2 784	2010-2014 (Average)	Admissions
	2 521	2 016	Registered Beds
Discovery Health (DH)	2 503	2 015	DH in-hospital Admissions
	2 631	2 015	DH claims paid
Medscheme	2 182	2 014	Medscheme Admissions
Netcare	2 422	2 016	Registered Beds
Mediclinic	2 183	2 016	Registered Beds
	2 210	2 014	Admissions

Source: HMI Final Report (Department of Economic Development, 2019, p. 71)

3.3 EMPIRICAL LITERATURE: PRIVATISATION AND CORPORATISATION OF HEALTHCARE MARKETS

Salmon (1995) highlights that healthcare reform worldwide has resulted in the transformation of the healthcare sector, in particular the growth of for-profit hospitals in service delivery, and evidenced out of the period from the 1990s the evolution of a new type of ownership in the form of investor-owned for-profit hospitals.

3.3.1 Evolution of the Healthcare Markets in the USA

Propper, Wilson, and Burgess (2005) investigated the evolution of the healthcare market in the USA and submit that the impact of competition in healthcare markets depends on the so-called "rules of the game", a metaphor for the "institutional features of the health care market". Dranove and Satterthwaite (as cited in Propper et al., 2005) outline three sequential regimes as encapsulating the historical evolution of the US healthcare market. The first regime, characterised by a cost-plus or full fee-for-service reimbursement regime, was evident in the 1960s where private hospitals were fully reimbursed on a cost-plus basis and patients were covered by generous insurance. This era, they submit, saw the introduction of government insurers, being public payers like Medicare and Medicaid, and the ballooning of physicians' incomes. At this time, "private insurers had begun to pay even higher charges,… this is before the MBA Chief Executive Officer had arrived on the healthcare scene" (Salmon, 1995). The

second regime evidenced increased regulatory pressures, the rising need to contain healthcare expenditure, and the introduction of the utilisation review models and prospective payment schemes by Medicare and Medicaid, with private insurers soon following suit. Prospective Payment Schemes, specifically, ushered in the replacement of fee-for-service regimes by reimbursement "according to average cost for a procedure or treatment group" to incentivise healthcare providers to contain the cost of care and to select against the treatment of patients with high costs. The final regime in this three-regime characterisation, although having its roots in the 1980s, only made its mark in the 1990s and is the third regime known as Managed Care. Here, to secure contractually discounted prices from hospitals, payers created the so-called preferred provider organisations (PPO) and these, in turn, contracted with hospitals for discounted prices (Propper et al., 2005). Salmon (1995) points out that whilst the PPO fundamentally sought to limit the pool of hospitals from which patients could choose to receive their care, a hybrid form provider organisation, the exclusive provider organisation (EPO) also emerged, and the distinguishing feature of the EPO is that the EPO essentially "locks in" enrolees to pre-selected provider groups. At the same time, there evolved other managed care organisations known as health maintenance organisations (HMOs), based on the principle of cost containment along "risk-sharing" basis between the insurer (payer) and the HMO. Specifically, within the managed care realm, Propper et al. (2005) describe risk sharing as an arrangement where the insurer enrols the insured/patient with the HMO at a fixed fee for a pre-determined period of cover, and further highlight an important dimension of the Managed Care regime beyond the primary metric of price, that being the drive to access quality of care information from healthcare providers (hospitals, doctors, etc.).

3.3.2 Privatisation in Healthcare Markets in Europe & Australia

Maarse (2006) conducted a study that analysed the evolution of the healthcare structures in eight selected European countries in terms of the mix between private and public sectors, and with the main focus being the extent to which the privatisation processes could be observed in the Bismark model countries versus their public health service model counterparts. The sample of selected European countries comprised four countries, Germany, France, Belgium, and the Netherlands, which are defined as Bismarck countries by virtue of "sharing a feature of social health insurance scheme and a mix of public and private provider agents in their healthcare provision". The three other selected countries, being Denmark, Sweden and the United

Kingdom, are defined as having a public health service model which is characterised by "hospital care that is largely in the hands of public provider agents", whilst the last of the eight selected countries is Poland which has its own version of the public health service model, the so-called Semashko model after it had become part of the Soviet-dominated part of Europe" (p. 983).

Maarse (2006) elaborates on the definition of privatisation in healthcare by drawing three salient distinctions. First, policy-driven privatisation versus privatisation driven by factors extraneous to public policy (Starr as cited in Maarse, 2006), where privatisation consequent to purposive government action is defined as policy-driven privatisation. Non-policy-driven privatisation, it is posited, may be demand-led privatisation as a result of spontaneous social response to public health delivery failures (p. 986). Referencing Vickers and Yarrow's work, Maarse (2006) draws a second distinction in healthcare privatisation as that between termination and contracting-out. Termination is characterised by a public reduction in scope, with services and responsibilities formerly defined as public shifted to the private sector, whereas with contracting-out, the public sector does effect scope reduction, but retains political responsibility and contracts with the private healthcare sector to deliver certain tasks. The study sample of European countries with a Bismarck-type healthcare system, Maarse submits, frequently followed the contracting-out in their privatisation strategy (p. 987). The third distinction Maarse draws is that between top-down versus a bottom-up privatisation strategy, the former being led by national government, such as enacting privatisation legislation, and the latter being led by public hospitals or local governments, such as privatisation of local public hospitals to relive local government's fiscal constraints. It is pointed out that the bottom-up privatisation decisions may conflict with national policy frameworks, resulting in public counter-privatisation policy reaction (p. 988).

In developing the comparative perspective to the analysis of the evolution of healthcare privatisation in Europe, in a study involving eight selected European countries, Maarse (2006) conceptualises Healthcare Financing, Healthcare Provision, Healthcare Management and Operations, and Healthcare Investment, respectively, as important dimensions of privatisation in healthcare.

Privatisation in Healthcare Financing, in particular, refers to the observation of the extent of a shift from public to private financing arrangement, meaning the increase in the size of private fraction in healthcare spending (Maarse, 2006, p. 989). Whilst there exists a healthcare "privatisation illusion" in the selected European countries, and contrary to the experience of many people in these countries that their out-of-pocket private healthcare expenditure has risen appreciably, the study found that, in six of the eight countries, privatisation in healthcare spending has, in fact, been limited (Maarse, 2006, p. 994). Privatisation in Healthcare Provision examines the trend in the shifting of ownership of a healthcare provider organisation from a public agent to a private one to be operated privately either not-for-profit or commercially (p. 994). No salient differences between Bismarck countries and public health policy were elucidated, with privatisation "more a matter of degree than of principle" in the former, whilst privatisation of public hospitals has a history of often encountering more public resistance in the latter, as evidenced by Danish, Swedish, and British experiences (p. 1000). In terms of Privatisation in Healthcare Operations, public provider organisations in all eight selected European countries were found to be contracting out an increasing part of their non-clinical activities to private organisations and in some instances, they were engaged in also contracting out diagnostic services. Also, the trend in the privatisation of Healthcare Management has been observed, where Germany's various public facilities in the quest to improve hospital efficiency, have contracted out operational management to private chains, and in Sweden too where privatisation of public hospital operational management has been experimented with. However, legislation in Sweden aimed at "protecting the hospital sector against uncontrolled privatisation" prevents private corporations from privately owning acute hospitals (p. 1001). Maarse further found that, notwithstanding significant variation in inter-country healthcare investment model, the overwhelming majority of Healthcare Investments in the selected European countries are financed from public resources, and thus capital investments remain significantly state-controlled (Thompson & McKee as cited in Maarse, 2006). The effect of this limited private investment role means the private investment market is confined to the less commercially enticing activities hitherto made up of health services not covered under social health insurance. Also, Maarse (2006) highlights that another challenge for private healthcare investment is that private investment returns must be recovered via improved efficiencies since health legislation in countries like Germany does not permit hospitals financed with private

capital to factor in private investment costs in their calculation of patient charges (Busse & Wörz as cited in Maarse, 2006).

Maarse (2006) concludes that healthcare in Europe has evolved to be more private (versus public) provision and categorised important trends as the "lack of growth of the public fraction in healthcare spending" since the 1980s, accompanied by the increase in the private fraction, evidence of shifting in healthcare provision from public to private, move to privatisation in healthcare management and operations, as well as privatisation in terms of healthcare investments (p. 981).

Brown and Barnett (2004) highlight that privatisation trends were, however, not confined to the USA and Europe as by the early 2000s, privatisation also became evident in Australia where corporate chain investor-owned private hospitals began to gain prominence in the provision of hospital care. They further note that Australia's private hospital sector bears "cottage industry" roots with its corporatisation being very recent. White and Collyer (1998), (as cited in Brown & Barnett, 2004), further point to the role of the Australian public sector in the development of private healthcare, highlighting that the Australian private healthcare sector exhibits a history of traditional public sector support through, inter alia, "public health funds transfer in the form of various subsidies and provision of infrastructure". However, notwithstanding the increasing importance of corporate involvement in healthcare in Australia, Brown and Barnett (2004) submit as per the Australian Institute of Health and Welfare Report, 1998, that the public sector fraction of healthcare expenditure is significant at more than two thirds.

3.3.3 Impact of Corporatisation and Privatisation on Healthcare Markets

Brown and Barnett (2004) further assert that hospital privatisation has conferred both benefits and costs to the healthcare market. Specifically, governments are noted to have struggled to contain rising healthcare expenditure and political pressure on the fiscus where they have pursued structural and healthcare reforms. As the healthcare industry has evolved and witnessed rising corporatisation, negative externalities such as hospital "competition upon overall costs, upon access for the indigent, and on the loss of important teaching and community functions of hospitals have all received attention" (p. 428). Pointing out that Scarpaci (as cited in Brown & Barnett, 2004) found the benefits of privatisation in-hospital

care to be primarily in increased consumer choice and in perceived cost efficiencies, Brown and Barnett (2004) immediately counter by highlighting that review of the literature does not, however, consistently support the case for cost containment by for-profit private hospitals. Clayton and Malcolm (as cited in Brown & Barnett, 2004) found it uncommon, on a case-by-case basis, for private hospital care to be cheaper, and Barnett and Barnett (as cited in Brown & Barnett, 2004), in a study of the New Zealand healthcare market, argues that through cost-shifting to primary healthcare and other non-hospital careers, private hospitals can reduce their average length of stay thereby achieving a reduction in total cost, but not essentially reducing the unit cost of hospital services.

The rising corporatisation of healthcare has been coupled with the encroachment of technology in healthcare production and organisation. Feinglass and Salmon (1990) in their study of evolving healthcare corporatisation in the USA, and specifically, the role of Medical Management Information Systems (MIMS) in the production of healthcare services, found rapid development of MMIS to be a strategic imperative in the environment of increased cost-containment pressure ushered by corporatisation and privatisation. Feinglass and Salmon (1990) further assert that increasing corporatisation was driving both the rapid development and role of MMIS for private hospital organisation seeking to maximise profits under a highly competitive reimbursement landscape, this as purchasers of healthcare (both public and private) seek greater accountability and transparency for their healthcare (hospital) expenditure (p. 235). Also, MIMS was indicated as pivotal in healthcare production re-organisation by being instrumental in enabling a change in power dynamics from clinical to corporate, with corporate managers structurally wrestling power from, hitherto autonomous physicians (p. 233). Whilst the emergence of MIMS offers many benefits such as appropriate care, better co-ordination among providers, an ability to improve the clinical care outcome assessment, and quality measurement, the other side of this path to corporatisation is the so-called "bureaucratization of health care delivery system" with the attendant negative effects of rising non-clinical costs of healthcare delivery, such as administration and information technology costs (p. 246-247).

3.3.4 The Funding-Provision Interface in the Delivery of Healthcare Services

Barros and Siciliani (2011), in studying the private-public interface in healthcare, assert the critical importance of a clear delineation of issues relating to healthcare funding; that is, who pays for healthcare, versus delivery of healthcare services, in this case, who the owners and administrators of the institutions providing healthcare are, in debates around healthcare systems, their efficiencies and outcomes.

These researchers (Barros and Siciliani, 2011) posit a *2 x 2 Matrix* to inform the organisation of the conceptualisation of the interface between the public and private sectors in healthcare. Barros and Siciliani (2011) bring to the fore health insurance, whether it be private insurance or public insurance, as a critical element of healthcare, and emphasise the fact that the two often exist side by side in given healthcare systems. Public provision of healthcare is also often either substituted or complemented by private provision. Therefore, the "two main areas of public-private interface in healthcare are the funding of healthcare expenditures on one axis, and the provision of healthcare on the other axis". On the funding axis, out-of-pocket payments complete a triumvirate of the fundamental healthcare sources of funds, over and above public and private insurance. Barros and Siciliani (2011), therefore, conclude that the public-private interface "occurs both in health insurance (funding) and in health care provision, leading to a simple 2 x 2 matrix of Funding x Provision" which matrix aids to frame the view on the health sector's public-private interface (p. 929-930).

Table 8: Public and Private Mix in Healthcare

	Public Funding	**Private Funding**
Public Provision	National Health Service	Not Defined / Not Applicable
Private Provision	Social Insurance	(Regulated) Private Insurance

Source: Barros & Siciliani (2011)

Private Healthcare Insurance and the South African Private Hospital Sector

In terms of the above framework by Barros and Siciliani (2011), and with reference to section 2.4 above on Medical Schemes, this study's selected South African Hospital Operators operate mainly under a Regulated Private Insurance Regime, where the provision of care is by for-

profit privately operated hospitals and where service to the patients is largely paid for (funded) by for-profit private administrators on behalf of private not-for-profit medical insurers called Medical Schemes.

3.3.5 Hospital Performance and Ownership Form

There exists a significant body of work that has sought to investigate the relationship between performance and form of ownership of hospitals. Below we interrogate different dimensions and aspects of performance against hospital ownership forms, described as public hospital, not-for-profit private hospital, and for-profit private hospital.

Cost efficiencies

Woolhandler and Himmelstein (2004) in their paper entitled "the high costs of for-profit care" contend that, at least in the USA market, investor-owned hospitals are strategically not cost minimisers but profit maximisers, and essentially see these two strategic positions as almost mutually exclusive. They further contend that certain "strategies that bolster profitability often worsen efficiency and drive up cost", such as high administrative costs and high Chief Executive Officer incomes, and that those strategies aimed at reducing costs, such as spending less on nursing care, often lower quality of care (p. 1814). Delving deeper into the examination of total hospital costs and exploring administrative costs, Woolhandler and Himmelstein (1997), used multivariate analysis to study the effect of public, not-for-profit private, and for-profit private forms of hospital ownership, respectively, on administrative costs in the USA between 1990 and 1994. Hospital costs were classified into four categories of "Administrative, Clinical, Mixed Administrative and Clinical, and Other Costs" (p. 771). They found that administrative costs fraction of total hospital costs were on the rise, but also that they were highest at for-profit hospitals. Woolhandler and Himmelstein (1997) also note that, notwithstanding the lead taken by for-profit hospitals in lowering average lengths of stay, this has surprisingly not translated into lower costs per admission at for-profit hospitals (p. 774). Finally, the researchers found that total hospital costs were also higher at for-profit hospitals; this against the expectation that competitive pressures would reduce administrative excesses in for-profit hospitals (p. 764).

In the Australian healthcare market, Duckett and Jackson (2000) revealed on the basis of available evidence and even after adjusting for case mix, that public hospitals, when compared to private hospitals, demonstrated greater efficiency in terms of cost. Based on these findings, the researchers submit that continued government support for private health in the form of private health insurance subsidies could therefore not be justified on efficiency grounds. So inefficient is the private hospital sector that Duckett and Jackson conclude that if government subsidies were directed at "purchasing public hospital treatment at full average cost, 58% of current private sector demand could be accommodated" (p. 439). However, McKee, Edwards, and Atun's (2006) research of private-public partnerships in the Australian healthcare system, whilst also acknowledging the above findings of Duckett and Jackson (2000) in respect of evidenced lower efficiencies of private hospitals compared to public hospitals, pointed out a possible confounding variable for the lower private hospitals efficiency, being the "more intensive management of patients in private hospitals", as certain more intensive procedures such as post-myocardial care investigations, procedures and management were more accessible in private hospitals (p. 890).

Chua, Palangkaraya, and Yong (2011) studied the link between competition and technical efficiency of public hospitals in the Australian State of Victoria, employing the HHI and the number of incumbent private hospitals to measure competition. The value of this study lies in the observation that before this investigation, whilst various aspects of hospital efficiency had been studied in Australia, none had until then attempted "to relate efficiency to hospital competition" (p. 254). The study also found a positive relationship between market concentration and hospital efficiency, consistent with recent findings. However, Chua et al. (2011) found a statistically significant and negative relationship between competition and efficiency when using the number of competing hospitals to measure competition. Also, this negative relationship was more pronounced when adjusting for non-private hospitals, meaning when not employing the number of all competing hospitals but only the competing private hospitals. Although this negative relationship between competition and efficiency for private hospitals was unclear, the authors "think it could reflect the competition among hospitals for scarce inputs, such as specialist surgeons, the supply of which is highly inelastic" (p. 265).

In the United Kingdom, Siciliani, Sivey and Street (2013) found that for publicly funded patients in the NHS, privately owned treatment centres exhibited a significantly lower length of stays (for a hip replacement on a risk-adjusted basis) attributing this finding not to selection but to efficiency. The rationale for the lower length of stay translating to cost containment, hence greater efficiency, they attribute to a greater incentive in a fixed payment model to restrain cost through optimal resource utilisation and by ensuring timely discharge. Also, early indications are that these improved efficiencies of lower length of stays are not at the expense of quality outcomes and shifting of care responsibilities up and down the care pathway. These United Kingdom findings are, however, contrary to those of Cheng, Haisken-DeNew and Yong (2015) in the USA which suggested evidence of cream-skimming and transfers between public and private facilities to contain costs and lower length of stay by private hospitals (p. 241).

Payments for Care (Healthcare Prices)

Devereaux et al. (2004) in their systematic review and meta-analysis involving eight observational studies revealed a statistically significant "higher payments for care at private for-profit hospitals compared to non-profit private hospitals" (p. 1817). The researchers point out that whilst a potential explanation for this observation could be that private for-profit hospitals, by offering superior care, are able to command a price premium. Greater payments are not, in their view, related to a superior quality of care as their previous meta-analysis studies demonstrated a lower quality of care. The support for this suggested lower quality of care in private for-profit hospitals is that, on a risk-adjusted basis, the private for-profit hospitals demonstrated a higher general mortality rate (Devereaux et al., 2002), and a higher mortality for haemodialysis patients was also evidenced at private for-profit dialysis facilities (Devereaux et al., 2004, p. 1822). However, possible reasons postulated by Devereaux et al. (2004) for the greater payments, being 19% higher than not-for-profit hospitals, are structural factors applicable to for-profit private hospitals but not to private not-for-profit hospitals, inter alia, the commercial imperative to generate higher revenues to meet investor returns, and higher administration costs burden. This is as evidenced by a 6% absolute increase in the administration expenditure fraction of hospital costs, and higher executive bonus incentives which measured at 20% higher than for not-for-profit hospitals (p. 1822).

It is further contended that the link between higher payments for hospital care and private for-profit hospitals may in fact be higher, the twin reasons being fraud and up-coding of patient diagnosis by for-profit hospitals. Specifically, these twin reasons are advanced by Devereaux et al., 2000 as to why present research's results may potentially underestimate the association. Silverman and Skinner (as cited in Devereaux et al., 2000) submit that for-profit hospitals, compared to not-for-profit private hospitals, exhibit higher levels of patient diagnosis up-coding to increase their reimbursement. Also, Guyatt (as cited in Devereaux et al., 2000) showed that fraudulent claims are unfortunately a problem in the private healthcare delivery systems and that private for-profit hospitals have been subject to the majority of major fraud lawsuits instituted against hospitals in the United States.

With the finding of for-profit hospitals exhibiting higher mortality rates (when adjusted for risk), coupled with higher payments for care than not-for-profit hospitals, the authors, therefore, posit that "policy should support not-for-profit health care delivery at the hospital level" (Devereaux et al., 2004, p. 1823).

Performance, Quality, and Efficiency

Rosenau and Linder's (2003) systematic two-decade review of the data-based assessment of 149 studies of differences in performance between private for-profit and private non-profit of United States healthcare providers published since 1980, revealed that against four selected performance criteria of "access, quality, cost/efficiency, and/or amount of charity care", overall, the private non-profits were mostly judged superior the majority of the time (59%), followed by the For-Profits who were superior at (12%), whilst for the remainder of the time (29%), no difference in performance was judged, or results were mixed. These findings, the authors assert, at least for the United States market, bear serious healthcare policy implications in the background of the global trend of privatisation (conversions to for-profit) of healthcare, and indeed hospital care in particular. Rosenau and Linder, therefore, conclude by advising caution at liberalisation policies in the United States that promote the change in the healthcare services landscape from private non-profit providers to private for-profit entities.

Cream Skimming by For-Profit Private Hospitals

Cheng et al. (2015), in their study of hospital transfers in the Victorian Hospitals System over a five-year period to 2005 investigated the element of "cream skimming behaviour" in the public-private interface of the mixed public and private hospital system in Australia. Cheng et al. define cream skimming as "the selection of patients with a lower expected average cost of treatment by hospitals and healthcare providers, which stand to gain financially by focusing on patients with less severe medical conditions" (p. 156). Ellis (as cited in Cheng et al., 2015) highlights that those hospitals reimbursed through designated diagnosis-related group (DRG) remuneration, which is fixed-price remuneration, are implicitly incentivised through the DRG classification system to select to treat patients with lower-than-average costs within the DRG, therefore, are more likely to perform cream skimming behaviour. Another form of cream skimming, the researchers Cheng et al. point out (in citing Levaggi and Montefiori, 2003), is where hospitals and doctors select certain treatments by choosing to specialise in and provide only those services with more profitable margins. This form of cream skimming is "horizontal" skimming, whilst the former is "vertical". Cheng et al. (2015) found evidence of cream skimming, involving the transfer of higher disease severity patients from private hospitals to public hospitals and also found that, relative to from private hospitals to private hospitals transfers, patients had a longer length of stay, and those stays also cost more.

3.3.6 Health Insurance (Reimbursement) Influence on the Competitive Behaviour of Private Hospitals

Bed Expansion Strategy

Research by Macquarie Securities Research (2014) seems to propose a relationship between the competitive strategy of private hospitals in South Africa – at least in terms of bed number expansion – and penetration of private healthcare insurance. In the South African private hospital context, for instance, Macquarie Securities Research suggests that the bed-expansion strategy of the incumbent listed hospital private operator, Life Healthcare, appears to be in line with potential growth opportunity of GEMS Health Insurance, one of the largest health insurance schemes in South Africa and the public health insurer of government employees eligible for private healthcare services (p. 3).

Cost-shifting

Whilst the above paragraph relates to long-term strategic behaviour in relation to a positive stimulus in the form of growing healthcare insurance market, on the converse, the negative effect of decreasing revenues to private hospitals, especially from public payments (publicly insured patients), has been described to result in competitive behaviour termed cost-shifting (Frakt, 2011). Notably, and beyond the private-public interface, "that hospitals charge one payer more because it received less relative to costs or trend from another also is widely believed. This is a dynamic, causal process called cost-shifting" (p. 91).

However, in interrogating the prevalence of cost-shifting, Frakt's (2011) review of evidence since the 1990s work by Morrisey's (2007) and Coulam & Gaumer's (1991) on cost-shifting suggests that cost-shifting, notwithstanding assertions by hospitals and the insurance industry of its inevitability, pervasiveness and scale, "can and has occurred, but at a low rate".

3.3.7 Stock Exchange Listing and Corporate Performance

International Experience

Factors that affect corporate performance have been a pivotal corporate finance line of inquiry, and the seminal research by Nickell, Nicolitsas, and Dryden (1997) sought to draw a link between corporate performance and firm productivity. Following on the foregoing work by Nickell et al. (1997), the determinants of firm productivity that drove firm performance were demonstrated to encompass, inter alia, the form of corporate control (Palia & Lichtenberg, 1999), financial pressure (Nickell et al., 1997), and product market competition (Januszewski, Köke, & Winter, 2002)

Having elucidated – and notwithstanding the importance of the identified drivers of performance, and noting that firms operate within a macro environment – it becomes critical to also examine how the firm's macro environment also affects firm performance. A rich body of corporate governance literature, and specifically initial public offering ("IPO") literature, exists that asserts that institutional and contextual characteristics, and in particular listing on the public bourse, confers both advantages and disadvantages that impact firm performance. Schoubben and Van Hulle (2008), citing corporate governance and IPO literature works of Jensen (1989), Allen (1993), and Pagano, Panetta, and Zingales (1998), highlight information

production with associated transparency of financial markets and reduction in capital constraints as two major advantages that listing on the public bourse confers on a firm. However, at the same time, Jensen (1989) and researchers such as Alexander and Mayer (1991) and Myers (2000) studied the disadvantages, or costs, associated with going public, and pointed to the agency conflicts as a major problem (p. 4).

With the link between productivity and performance elucidated, and the advantages (and disadvantages) of listing expounded, it is the work of Schoubben and Van Hulle (2008) conducted in Belgium that later demonstrated the relationship between listing on the stock exchange and firm performance. These researchers' work showed that listing on the stock exchange had a positive impact on the functioning of the drivers of performance, being product market competition, financial pressure and form of ownership. Notwithstanding even more concentrated ownership and less transparent capital market of Continental Europe, they concluded that listing, or more specifically the public stock exchange environment, is beneficial to the performance of the firm.

African Experience- South African Listed Environment

Mashaba's (2014) review of IPO literature (citing Aggarwal, 1990, Young and Zaima, 1998), and Gompers and Lerner 2001) highlights that in developed markets, researchers have focused largely on firm performance in terms of initial investor and long-term investor returns. Also, research focus on emerging markets such as South Africa's JSE main board, has been along similar veins, ranging from investigation of IPO performance of small capitalisation firms (citing Boles, 2001), price performance of new listings (citing Lawson, 1996), aftermarket performance of new listings (citing M'kombe, 2000 and Moodley, 2009) (p. 13). In particular, Mashaba (2014) investigated the IPO performance of companies listed, not on the JSE main board, but on the JSE Alternative Exchange for small- and medium-sized enterprises ("SMME") with a promise of high growth and higher returns expectation.

3.3.8 Going Public by Private Hospitals

Having perused IPO literature, determinants of performance, and the impact of listing on performance drivers, we explore the strategic imperatives that may inform managerial decisions for for-profit private hospitals to go public and list on the public stock exchange.

Developed Markets: USA

Claxton, Feder, Shactman, and Altman (1997) submit market share and corporate growth strategies through mergers and acquisitions (M&A) to be a strategic imperative for public investor-owned hospital chains. Specifically, they contend (citing Sandler & Tomsho, 1996), that the high price-to-earnings multiples (P/E x) valuations of stock exchange-listed private hospital chains reflect investor growth expectations, and M&A becomes a strategic enabler to achieve revenues growth required to satisfy growth expectations of their equity investors. Further, "the dynamic of the stock market is argued to creates additional M&A pressure". Claxton et al. (1997) contend that use of script, corporate paper, is viewed by corporate management as a competitive advantage. This means for-profit firms can expand their market shares by financing their acquisitions of competitors by issuing stock and this confers market advantage as growth is achieved without reducing capital reserves nor increasing balance sheet leverage (debt). To underscore strategic corporate use of script issuance, Claxton, et al. (1997) cite the example of United Healthcare reportedly issuing, in the year 1994 alone, over sixteen million shares of stock to support their acquisitions funding.

Developing Markets: Africa; Kenya

In the study of the Kenyan private hospital market, Owuor, (2012) observed that for Kenyan private hospitals finance managers, enhanced funding for growth, financial flexibility, and external monitoring were identified as the top three motivations for potentially deciding to list on the stock exchange. Further, Owuor found that while the primary motivations for going public differed mainly according to hospital size, with external monitoring the most important benefit for large hospitals, and the ability to raise capital for growth being primary for smaller hospitals, overall managers concurred that the benefits of going public significantly outweighed the cost in the long run.

Issues of Valuation in Emerging Markets

Segawa (2013) highlights some critical issues of valuations in emerging markets in his study of JSE-listed private hospitals in the South African markets. He noted that beyond the challenges of accounting, reporting, and governance compliance in the listed environment, it is important to factor in that in developing markets, valuations of listed stocks face some unique difficulties. Whereas efficient markets are expected to aid in price discovery, in developing markets, listed equity valuations is often a challenge because of various structural, institutional, market depth, political and regulatory challenges. Further, Segawa (2013) in the development of an approach to valuation of hospitals in emerging markets, points to unpredictable long-term growth forecast, high transaction costs, inflexible labour markets, policy and regulatory uncertainty, and opacity of capital cost estimation due to currency and bond spread volatility as all having an effect on the efficiency of developing stock exchanges such as the JSE, hence resulting in potential under-valuations of JSE counters.

Beyond a primary listing - Cross Listings

Beyond domestic listing, firms domiciled and listed outside the USA invariably attain a second listing in the USA, termed a cross-listing or dual listing. Whilst this study confines its focus to the listing on the JSE and performance, and whereas only Mediclinic of the three South African listed Hospital Operators have sought cross-listing offshore beyond the JSE (Mediclinic, 2017), to explore the strategy of going public to its fullest extent, we briefly summarise what the empirical evidence suggests may motivate corporations such as listed Hospital Operators to seek a cross-listing.

A summary of empirical results by Benos and Weisbach (2004) suggests the motivations for cross-listings in the United States include minority shareholder protection, access to capital, increasing firm value, and the existence of private benefits, as managers seek to capture firm resources.

Finally, Benos and Weisbach (2004) in the same research, suggest that the basis of legal jurisprudence may be a determinant for cross-listing, with French Civil Law firms motivated by shareholder protection shareholders whilst English Common Law firms (that would include

South African English common law hospital operator firms) may be motivated by gaining access to capital markets in the United States.

3.3.8 Going Private: Public-to-Private ("PTP") Transactions

Reversal of the Going Private Wave?

Notwithstanding the motivations for going public – such as the perceived corporate status enhancement and the benefit of stronger balance sheets by the inflow of equity capital from an initial public offering – there is presently a reversal of the going private wave, with some suggesting "that the balance between the agency costs and incremental benefits of going public is undergoing a fundamental change that will transfer ownership from diversified public shareholders to private ownership or quasi-public ownership in the USA" (Gilson & Whitehead, 2008).

Beyond the well-documented negative consequences of take-private transactions such as increasing valuation opacity, decreasing liquidity due to lack of access to equity markets, lack of financial flexibility resulting in growth being funded mainly through debt, Valenti and Schneider (2014) highlights the negative impact on governance structures and most importantly the effect of the less differentiated separation of management from ownership.

Indeed, in South Africa, Life Healthcare went public on the JSE in 1999 only to be taken private again in 2005 by a consortium led by senior management and influential BEE private investors. There was a reversal, and Life Healthcare was re-listed once more in 2010, a reversal of a reversal (Rand Merchant Bank, 2010).

Finally, in investigating the role of governance in the motivations for taking firms private, Valenti and Schneider (2014) concluded that certain antecedents of governance, such as "the greater proportion of internal directors and greater institutional investment, were significant to the going-private decision post the recession compared to prior to it" (p. 104).

3.4 CONCLUSION

This chapter has performed a brief review of the evolution of the privatisation and corporatisation of healthcare services globally, in both developed and emerging markets. It gave a precis of the healthcare funding-provision interface, and briefly explored competition and antitrust within the healthcare sector.

Also, the chapter examined the characteristics of healthcare services that make this market deviate from the textbook competitive markets. Specifically, a case is made for one of the industry's most striking features being the rationale for the private yet "not-for-profit" private hospital, and the chapter also briefly explored competition and antitrust within the healthcare sector.

The chapter builds a logical line of inquiry that interrogates capital sources of finance for hospitals, examines the case for non-profit private hospitals, then explores a case against their conversion for profit motives to for-profit private hospitals. Building on this platform, we first interrogate patient choice of hospital and then whether, or not, ownership form (public vs. non-profit vs. for-profit) affect performance (profit, cost efficiency, and quality outcomes) of hospitals. Having explored the rationale and effects of going for-profit private, but still privately owned, we subsequently explore the motivations for taking the next steps of going public via an initial public offering. Whilst the motives for listing are well-documented, both generically and in the hospital space, the literature is silent on the identified area this study, therefore, seeks to research. Specifically, the study seeks to investigate the relationship between listing on the JSE and long-term competitive advantage by focusing on the impact of listing on the financial performance of the JSE-listed South African Hospital Operators.

CHAPTER FOUR

METHODOLOGY

4.1 INTRODUCTION

Whereas the previous chapter provided an exposition of the current body of literature informing the study's line of inquiry, this chapter provides the study's research methodology employed within a framework that encompasses the study design, data types, data collection instrument and data sources. The chapter further outlines the sample selection procedure, description of relevant units of analysis, and identifies the analytical technique employed to address the research questions.

4.2 RESEARCH APPROACH

According to Williams (2007) research lends itself to three common approaches, being quantitative, qualitative and mixed methods.. Quantitative research is described as "involving data collection that is typically numeric with the research tending to use mathematical models as the methodology of data analysis" (p. 66). The author further defines four types of quantitative research methods, which are descriptive research, correlational research, developmental design research, and observational research (Williams, 2007). Corellational research method investigates a relationship between two concepts, specifically examining relational statements and causal statements. The former interrogates association where one concept has a form of influence on the other, whilst the latter seeks to elucidate causality where one concepts causes the other to change (Walliman, 2011). This study uses correlational quantitative research and considering that the intent of the study was to investigate the relationship between JSE Listing and the performance of selected private Hospital Operaors in South Africa, this research design is deemed appropriate.

4.3 TARGET POPULATION

The target population for this research was all the Private Hospitals Beds (n= 40 6820) in South Africa, operated by both Johannesburg Stock Exchange listed and unlisted private hospital operator groups. Both 24-hour multi-disciplinary acute hospitals and day-hospital beds (day theatre cases facilities) were included whilst the lower clinical acuity care beds such as Psychiatric, Rehabilitation, Primary Healthcare Clinic and Sub-Acute beds were excluded.

4.4 DATA ISSUES

Data collected for the study was secondary data, and no data was collected via any primary sources such as structures questionnaires, nor interviews. Secondary data sources (for the listed Hospital Operators) was mainly from publicly available integrated annual financial reports, whilst literature review from research institutions, official publications, internet publications, industry organisations' reports, the national statistics bureau - StatsSA, financial and economic journals supported the remainder of the secondary sources of data.

The nature of the data collected is chiefly quantitative and we primarily employed Microsoft Excel (2016) spreadsheet to record the captured variables. The frequency of the data is annual and covered the time horizon of ten years, from 2008 to 2017. The data collected covered not only pure financial reporting data but also captured a non-financial reporting variable of interest in the form of the evolution of licenced hospital bed numbers growth for each selected hospital operator group.

In all, data was captured from five South African private hospital operator corporate entities and one industry lobby group representing two of the five aforesaid corporations. The selected corporations were categorised into two groups based on whether they are listed on the main board of the Johannesburg Stock Exchange in Johannesburg, Republic of South Africa, or not. This resulted in the categorisation of the selected private hospital operator groups into the Johannesburg Stock Exchange listed group ("ListCos") and the group that is not listed on the Johannesburg Stock Exchange.

The Listed hospital operator group comprised three companies, being Netcare, Life and Mediclinic, respectively. The ListCos, in compliance with the public bourse report

requirements, report their performance semi-annually, resulting in a robust source of publicly available data, which extends in breadth beyond pure financial data to cover also licenced beds data, and periods exceeding ten years. On the other hand, the unlisted group, not beholden to the JSE governance and public reporting requirements, meant only one hospital operator group not listed on the JSE, the Lenmed Group ("Lenmed"), publicly published their financial results, including their hospital bed numbers in their integrated reporting. Therefore, in terms of pure financial reporting data for the 10-year study period to 2017, the only data available for the unlisted hospital group was from the Lenmed Group. The National Hospital Network's (described below) licensed Hospital Beds data was employed as a source for the unlisted hospital group's non-financial performance data of hospital bed growth. The inability to source financial and bed growth data on incumbents in the unlisted private hospital sector, and the use of aggregated data from the NHI on the unlisted private hospitals, introduce an element of self-selection bias to the study.

As the competitive landscape in the South African private hospital sector has evolved, the unlisted hospital operators (as suppliers of private hospital services) in an effort to enhance their selling power to the Administrators of Medical Schemes (as purchasers of private hospital services) formed a voluntary membership bargaining group called the National Hospital Network Group (the "NHN"). Even though the NHN mandate does not encompass financial data collection from its members, yet another very important sectoral role of the NHN has been to collect and collate licensed bed numbers of its members. Whilst, as per Econex (2017), the ListCo oligopoly commands about 70% majority fraction of the South African private hospital market, the NHN represents the bulk, about twenty-five percent (25%), of the remaining market share, hence a powerful proxy for the private Hospital Operators that are not listed on the JSE main board. Therefore, as stated above, in terms of hospital bed numbers for the unlisted hospital group, the credible NHN licenced beds data source was employed.

4.5 REGRESSION MODEL

The regression equation to examine the effect of JSE Listing Status on the performance of selected private Hospital Operators in South Africa is specified as:

$$\boldsymbol{hp_{i,t} = \beta_0 + \beta_1 listing_{i,t} + \beta_2 hcinf_t + \beta_3 medins_t + \varepsilon_{i,t}} \qquad \mathbf{1}$$

where i and t represent hospital operator and year respectively; hp represent proxies for hospital performance measured as Total Annual Revenue (TOTREV), Revenue per Bed per Day (REVBDAY), EBITDA margin (EBITDA), and Total Number of Licenced Hospital Beds (BEDS); Listing denotes the status of being listed on the Johannesburg Stock Exchange. Whilst the study focus is the impact of listing on the performance of selected private Hospital Operators the study recognises that there may be other variables that could impact firm performance. Therefore, two control variables were added to the regression model to bring in more explanatory power to the model and to seek to minimise the load on the error term ($\varepsilon_{i,t}$). The two control variables are Healthcare inflation ($hcinf$) and Medically Insured Population ($medins$), respectively. Equation 1 is expanded to include equations for the proxies of hospital performance for equations 2 to 5 as:

$$\boldsymbol{totrev_{i,t} = \beta_0 + \beta_1 listing_{i,t} + \beta_2 hcinf_t + \beta_3 medins_t + \varepsilon_{i,t}} \qquad \mathbf{2}$$

$$\boldsymbol{revbday_{i,t} = \beta_0 + \beta_1 listing_{i,t} + \beta_2 hcinf_t + \beta_3 medins_t + \varepsilon_{i,t}} \qquad \mathbf{3}$$

$$\boldsymbol{ebitda_{i,t} = \beta_0 + \beta_1 listing_{i,t} + \beta_2 hcinf_t + \beta_3 medins_t + \varepsilon_{i,t}} \qquad \mathbf{4}$$

$$\boldsymbol{beds_{i,t} = \beta_0 + \beta_1 listing_{i,t} + \beta_2 hcinf_t + \beta_3 medins_t + \varepsilon_{i,t}} \qquad \mathbf{5}$$

4.6 MEASUREMENT AND DEFINITION OF VARIABLES IN STATISTICAL MODEL

4.6.1 Dependent (Performance) Variables

The model's dependent variables capturing the firms' performance ($hp_{i,t}$) in terms of pure financial performance are Total Annual Revenue (TOTREV), Revenue per Bed per Day

(REVBDAY) and EBITDA margin (EBITDA), whilst the dependent variable Total Number of Hospital Beds (BEDS) captured firms' performance in terms of the firms' propensity to grow bed numbers. The table below summarises the measurement and definition of the model's dependent variables.

Table 9: Dependent Variables

Variable	Description	Definition	Source
BEDS	Hospital Beds	Total Number of Group Licensed Private Hospital Beds	AFS*/NHN**
TOTREV	Total Revenue	Total Annual Group Revenue, measured in South African Rand (ZAR)	AFS
REVBDAY	Revenue/Bed/Day	Average Revenue generated per Licensed Private Hospital Bed per Day, measured in South African Rand (ZAR)	AFS
EBITDA	EBITDA Margin	Annual Group Operating Profit margin, being Earnings before Interest Tax Depreciation and Amortization measured in South African Rand (ZAR), as a percentage of Total Annual Group Revenue	AFS

Source: AFS*- Reported Annual Audited Financial Statements; NHN**-NHN Data 2008-2017

4.6.2 Independent Variables

The regression model's independent variables explaining the firms' performance ($hp_{i,t}$) consists of the focus variable, being the hospital operator's status in terms of whether, or not, they are listed on the JSE (LISTING). Two control independent variables are added to the regression model, over and above the focus variable, and these are the Medically Insured Population (MEDINS) and the South African Healthcare inflation (HCINF), respectively.

The expected sign, or direction, of each of the Betas in the regression model equations, is based on the researcher's knowledge of the South African healthcare sector as a private medical practitioner and financial markets professional in roles as a credit analyst and investment banker, jointly over a period of over 25 years.

Table 10: Independent Variables

Independent Variable	Description	Definition	Source	Expected Sign of the Beta
LISTING	JSE Listing	Publicly listed and trading on the JSE	JSE	Positive
MEDINS	Medically Insured Population	The Total Population covered for healthcare expenditure by Medical Schemes, comprising both Principal Scheme Members and their Dependents	Council for Medical Schemes (CMS) Annual Report	Positive
HCINF	Healthcare Inflation	South African Annual Healthcare Inflation as measured by StatsSA and comprising both in-hospital and out-of-hospital healthcare inflation	StatsSA	Negative

Source: JSE (2018), StatsSA (2018), CMS (2018)

The tables below provide a summary of the relevant population numbers, both the national population and medically insured population, and highlight inflation numbers, being the South African Consumer Price Index Headline ("CPI") and Healthcare Inflation, respectively.

Table 11: Medically Insured Population vs. Total South African National Population

Population (millions)	Year 1 (2008)	Year 10 (2017)	2008-2017 Growth (millions)	2008-2017 CAGR
Medically Insured Population	7,87	8,87	1,00	1,34%
Total SA Population	48,7	56,52	7,82	1,67%

Source: StatsSA (2008), StatsSA (2018), CMS (2018)

Table 12: Healthcare Inflation vs. CPI

Inflation Measure (Y-o-Y Rate)	Year 1 (2008)	Year 10 (2017)	2008-2017 Growth (#)	2008-2017 CAGR
Healthcare Inflation	5,5	5,4	-0,1	-0,20%
South African CPI	11,5	5,3	-6,2	-8,25%

Source: StatsSA (2008), StatsSA (2018)

4.7 ESTIMATION TECHNIQUE: SEEMINGLY UNRELATED REGRESSION

The Seemingly Unrelated Regression ("SUR") of Zellner (1962) was employed to estimate the models in Equations 2 to 5 specified earlier. As highlighted by Alhassan and Biekpe, (2018), in examining the "assumptions underlying the efficiency of the model's coefficients", the estimation of the correlation of the coefficients of the explanatory variables is first undertaken to "assess the correlation among the independent variables before proceeding with the regression estimation". The second test – and in line with Zellner (1962) – assesses aggregation bias and "assumes that the coefficients across the system of equations are significantly different from one another ($x_{(i,t)1} = x_{(i,t)1} = 0$). The rejection of the null hypothesis suggests efficiency of the SUR estimates compared to that of the ordinary least squares estimation" (Alhassan & Biekpe, 2018, p. 505).

Whilst it may at first appear that the equations in a single model comprising a set of linear equations are unrelated, it may be unrealistic to expect that there is no correlation in the equations' error terms. "A set of equations that has contemporaneous cross-equation error correlation, that is, the error terms in the regression equations are correlated is called a Seemingly Unrelated Regression System" (UCLA Statistical Consulting, 2016), as first described by Zellner (1962). Zellner applied Aitken's (1934) "generalized least-squares" to a system of equations and found the regression coefficient estimators obtained to be more efficient than those derived from the step-by-step estimation from the equation-by-equation application of the least-squares. Zellner further points out that where the independent variables in the individual equations do not exhibit high correlation and the error terms of the equations are, however, highly correlated, then the gain in efficiency of the parameter estimates is enhanced. A further assumption to the efficiency of the regression coefficients is the demonstration of the "no aggregation bias"; this again as per Zellner (1962), based on the

"hypothesis that all the regression equation coefficient vectors are equal", and that if the hypothesis is accepted, then no aggregation bias exists.

This study employs a system of regression equations with different dependent variables and the same explanatory variables, therefore, there exists a possibility of the regression equations' error terms being correlated. Given these correlations, Alhassan and Biekpe (2018) suggest that a system of equations is to be utilised in order "to improve the efficiency of the predicted coefficients" of the study's regression model. Hence we have employed, as the estimation technique, the seemingly unrelated regression (SUR) of Zellner (1962). The study has, therefore, utilised the SUR system to estimate a regression model with four different dependent variables which are proxies of hospital performance, being Total Annual Revenue, Revenue per Bed per Day, EBITDA margin and Total Licensed Hospital Beds, respectively, and the same independent variables of Listing, Medically Insured Population and the South African Healthcare Inflation.

In the employment of the SUR model, Greene (2012) further points to the assumption of strict exogeneity of the independent variables (Xi) and homoscedasticity. Strict exogeneity requires that the error terms are uncorrelated with all past and future explanatory variables; that is the expectation of the error term at any given time s, given the independent variable at any time other than s, including when $s = t$, has to equal zero, $E[\varepsilon_t \mid Xs,] = 0$. The homoscedasticity assumption, on the other hand, requires that there is no change in the variance of the error terms.

4.8 LIMITATION OF THE STUDY METHOD

The main limitation of the study was the absence of financial reporting data and bed numbers of the unlisted private Hospital Operators. Specifically, the researcher had access to only one unlisted Hospital Operator's financial information, against that of three listed operators. This limitation in the cross-sectional dimension of the dataset, therefore, limits the ability to perform more robust modelling.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 INTRODUCTION

Chapter five presents, interprets and analyses results. The chapter commences with descriptive statistics which includes central tendency measures, whilst the succeeding section 5.3 undertakes correlation analysis. We conclude the chapter in section 5.4 with the regression results presentation, including the description of the associated SUR regression equations, along with their underlying analysis and interpretation.

5.2 DESCRIPTIVE STATISTICS

The selected hospital operator companies are divided into two groups based on their JSE-Listing Status. Whilst hospital bed numbers data of the NHN and Lenmed represent the unlisted group's bed numbers, only Lenmed's financial data is employed in terms of financial performance proxies of Total Annual Revenue, Revenue per Bed per Day, and EBITDA margin, respectively, for the unlisted group. Data from all three listed operators, Netcare, Life Healthcare, and Mediclinic, is used for the bed numbers and financial performance of the listed group. The regression equation's dependent and independent variables exhibit varying levels of performance cross-sectionally for the selected Hospital Operators over the study period of ten years to 2017, and this is summarised in Table 13.

The dependent variable, Total Annual Revenue, has ranged from a minimum of ZAR166m to a maximum ZAR1 559m, reflecting the relatively smaller average size of the unlisted group operators as compared to their listed counterparts who reflect a range of ZAR6 056m to ZAR19 114. The average Total Annual Revenue for the unlisted is ZAR743m, appreciably lower than that of the listed group at ZAR1 267m, once more underscoring the disparity in size, in terms of annual revenue, between the two groups.

Table 13: Summary Statistics

		BEDS	EBITDA	TREV	REVBDAY	MEDINS	HCINF
Unlisted	Mean	3233.633	21.952	743.9	2172.4	8.562	6.19
	Std Dev	3317.155	5.992697	527.761	629.3224	0.3465536	1.717326
	Min	194	14.34	166	1313	7.87	4.7
	Max	10622	32.01	1559	2964	8.88	10.8
	Count	30	10	10	10	30	30
Listed	Mean	8345.2	22.62567	12167.73	3928.033	8.562	6.19
	Std Dev	933.8133	2.951672	3568.921	795.7078	0.3465536	1.717326
	Min	6685	16.75	6056	2384	7.87	4.7
	Max	10181	28.3	19114	5144	8.88	10.8
	Count	30	30	30	30	30	30
All	Mean	5789.417	22.45725	9311.775	3489.125	8.562	6.19
	Std Dev	3532.685	3.853983	5884.933	1074.681	0.3436042	1.70271
	Min	194	14.34	166	1313	7.87	4.7
	Max	10622	32.01	19114	5144	8.88	10.8
	Count	60	40	40	40	60	60

Notes: BEDS=Total number of hospital beds; EBITDA= Earnings before interest and tax, depreciation and amortization (%); TREV= Total Revenue; REVBDAY= Total revenue per bed per day; MEDINS= Medically insured population (%); HCINF=Healthcare inflation (%).

Average Total Revenue per Bed per day for the listed at ZAR3 928m is almost double that of the unlisted's at ZAR2 172m, with the listed attaining the highest level of ZAR5 144m, achieved by Netcare in 2017, whilst Lenmed, on the unlisted side, posted the highest Average Total Revenue per Bed per day of ZAR2 964 in 2014. Whilst it may appeal to intuition to wholly ascribe the ListCos' reported higher Average Total Revenue per Bed per day purely to potential pricing power these listed Hospital Operators by virtue of their market dominance may be able to exert over Medical Scheme Administrators (who in turn are the purchasing agents on behalf of Medical Scheme members), there are other factors that come into play that affect the total annual amounts paid to hospitals, and ultimately the resultant blended Average Total Revenue per Bed per day, as discussed in section 2.5 above. Average Total Revenue per Bed per day observations across the listed group was within ZAR795 of the Average Total

Revenue per Bed per day of ZAR3 928, and within ZAR629 of the average of ZAR2 174 for the unlisted group, respectively.

The selected listed Hospital Operators' group, evidencing stronger market share, commanded an average Hospital Beds number of 8 345, being over twice that of the unlisted group at 3 233 registered Hospital Beds. Also, the variation in total bed count was significantly lower over the study period for the listed group compared, with standard deviation of 933.8 against that of the unlisted group which was more than three times higher at 3 317.

EBITDA margins across the selected Hospital Operators over the study period have demonstrated greater variability among the unlisted group compared to the listed group, with the unlisted EBITDA margin standard deviation observed being just over twice that of the listed group at 5,99%, versus 2.95% for the listed group. This observed variability differences between the two groups are further borne out by a much wider operating margin range, 14.34% to 32.01%, for the unlisted group compared to 16.75% to 28.3% for the listed group. Notwithstanding the above operating margin variability, the average EBITDA margin observed over the 10-year study period for the two groups is not too far apart, at 22.62% for the listed group and Lenmed returning a slightly lower EBITDA margin of 21.95% for the unlisted group proxy. Observably, despite higher Total Annual Revenues generated, superior Hospital Bed Numbers, and higher Revenue per Bed per Day commanded by the listed group, this competitive position is not mirrored by the achievement of superior operating margin performance by the listed group over the unlisted group.

The Medically Insured Population is a critical healthcare sector variable expected to demonstrate some impact on hospital operator performance. Medically Insured Population averaged 8.56 million dependents over the observation period. The lowest population size was 7.87 million dependents, peaking at 8.88 million in 2016. Indeed, over the study period, the 2017 reported year was the first time in a decade of records that the total number of Medical Scheme dependents had declined year-on-year, to 8.87 million from the 2016 peak. The observed Medically Insured Population has shown very low variability and is within 0.346 % of the average Medically Insured Population over the study period.

Over the ten years of the study period to 2018, the observed growth of the South African population was a compound annual growth rate ("CAGR") of 1.67% to 56.52 million (StatsSA, 2008, 2017), and the growth of the medically insured population, although also revealing a positive trend, lagged behind at 1.34% to a total population of 8.87 million dependents in 2017 (CMS, 2018).

Inflation, measured in terms of CPI, as a macroeconomic environment factor, and more granularly as healthcare inflation at a sectoral level, is an important variable expected to impact hospital operator performance. The average Healthcare Inflation recorded over the observation period in South Africa was a mean of 6.19%. The minimum Healthcare Inflation rate recorded was a rate of 4.7% which was achieved in 2013, and the highest level observed was 10.8% in 2009, presumably a lagging aftermath to the Global Financial Crisis of 2007/8. Healthcare Inflation variability observed was within 1.71 % of the average Healthcare Inflation. Whereas CPI has decreased by a sizeable annual compound rate of negative 8.25% to 5.3% in 2017, Healthcare Inflation has been stubborn and hardly changed in the same 10-year observation period. Indeed, whilst CPI has halved, from 11.5% in 2007, Healthcare Inflation has hardly moderated recording 5.4% in 2017 from the 5.5% level of a decade earlier in 2007 (Erasmus & Fourie, 2014)

5.3 CORRELATION ANALYSIS

Gujurati and Porter (2010), however, emphasise some cardinal points about practical detection of multicollinearity; that is, we cannot, per se, test for it but can "measure its degree in a particular sample", and there exists not a single and absolute measure of multicollinearity, but that there are indicators that can give the researcher valuables clue about its existence. One such indicator, and its associated rule of thumb, is the observation among explanatory variables of high pairwise correlation, and if the same correlations are in excess of 0.8 in measure, then serious collinearity possibly exists (p. 254). The focus of the study's correlation analysis, therefore, is to examine the strength of the association among the three independent variables in the model, being, Listing, Medically Insured Population and Healthcare Insurance, thereby, gain some clues as to the possibility of the presence of multicollinearity, or otherwise. The correlation matrix generated by the Stata statistical

software from the seemingly unrelated regression model input and the results are highlighted in Table 14.

Table 14: Correlation Analysis

	1	2	3	4	5	6	7
1. BEDS	1.000						
2. EBITDA	0.029	1.000					
	(0.858)						
3. TREV	0.941	0.033	1.000				
	(0.000)	(0.839)					
4. REVBDAY	0.822	-0.079	0.941	1.000			
	(0.000)	(0.630)	(0.000)				
5. LISTING	0.730	0.077	0.851	0.716	1.000		
	(0.000)	(0.638)	(0.000)	(0.000)			
6. MEDINS	0.156	-0.197	0.347	0.516	0.000	1.000	
	(0.234)	(0.222)	(0.029)	(0.001)	(1.000)		
7. HCINF	-0.078	0.132	-0.179	-0.314	0.000	-0.562	1.000
	(0.555)	(0.418)	(0.270)	(0.049)	(1.000)	(0.000)	

Notes: BEDS=Total number of hospital beds; EBITDA= Earnings before interest and tax, depreciation and amortization (%); TREV= Total Revenue; REVBDAY= Total revenue per bed per day; MEDINS= Medically insured population (%); HCINF=Healthcare inflation (%).

We notice from the correlation analysis table above that there is no strong pairwise correlation among any of the independent variables, and that no correlation coefficient measure is in excess of 0.8, therefore the correlation output does not suggest a problem of multicollinearity in the model. The absolute measure of the correlation coefficient and the symbols leading the coefficients indicate the strength and direction of the correlation, respectively.

Healthcare Inflation shows no correlation to Listing and is observed to be slightly negatively correlated with Medically Insured Population. Healthcare Inflation further shows a weak negative correlation with Revenue per Bed per Day, Total Annual Revenue, and Hospital Beds, whilst indicating a weak positive correlation with EBITDA margin. Medically Insured Population reveals no correlation with Listing and shows a weak positive correlation with Revenue per Bed per Day, Total Annual Revenue, and Hospital Beds, whilst the correlation

with EBITDA margin is a weak negative. Listing indicates a strong positive correlation of 0.851 with Total Annual Revenue, and a fairly strong positive correlation with Revenue per Bed per Day (0.716) and Hospital Beds (0.730) but returns a very weak positive correlation with EBITDA margin. Revenue per Bed per Day is observed to be highly positively correlated with Total Annual Revenue and Hospital Beds as shown by the positive correlation coefficients of clover 0.8. On the other hand, Revenue per Bed per Day is very weakly negatively correlated with EBITDA margin. Total Revenue is indicated to be highly positively correlated with Hospital Beds with a positive correlation coefficient of close to 1.0, very weakly positively correlated to EBITDA margin, whilst EBITDA margin, in turn, shows a very weak positive correlation with Hospital Beds.

5.4 REGRESSION RESULTS: SEEMINGLY UNRELATED REGRESSION MODEL

The study SUR Regression Model is a system of simultaneous equations that regressed three independent variables of Listing, Medically Insured Population and Healthcare Inflation against proxies of the dependent variable of Hospital Performance ($hp_{i,t}$), being, Total Annual Revenue, Revenue per Bed per Day, EBITDA margin, and Hospital Beds, respectively. The SUR regression results are summarized in Table 15 below. Based on the results of the correlation analysis above, where the independent variables of the model equations exhibited no correlation, the study then proceeded with the regression coefficient estimation employing the Seemingly Unrelated Regression Model. In analysing the data in Stata statistical software, as a condition for robustness in the regression, a command was input to ensure that the computations of the model considered the conditions of normality, endogeneity, heteroscedasticity and auto-correlation in estimating the regression coefficients.

Goodness of fit (R-squared and Chi-squared)

The R-squared scores shown in the summary table below, reflect the extent to which the model fits, or can explain, the variability in the predicted variables. The tests for goodness of fit are further corroborated by the Chi-square test results below, which are a measure of how well the distribution of the observed data fits the expected distribution if the model variables are independent. In terms of explaining the dependent variables, which are proxies of hospital

performance, the model indicates very high R-square scores for Total Annual Revenue and Hospital Beds of 0.9469 and 0.9406, respectively, implying that the model's independent variables explain 94.69% and 94.06% of the variability in Total Annual Revenue performance and Hospital Bed Numbers, respectively. The model demonstrates further goodness of fit for these two independent variables with high Chi-squared scores that are statistically significant at 1%, with p-values of $\chi 2$ (Prop>$\chi 2$) of 0.000 and 0.000, respectively. For Revenue per Bed per Day, the results indicate an R-square of 0.7607, meaning that 76.07% of the variation in Revenue per Bed per Day is explained by the model, whilst the associated Chi-square p-value of 0.000 demonstrates goodness of fit for the model, at a significance level of 1%. On the other hand, only 1.43% of the variation in EBITDA margin is explained by the model, the remainder 99.57% movement is, hence, not explained by the model and may be caused by factors external to the model, and this is borne out by the low R-square score of 0.0143. Also for EBITDA margin performance, the associated Chi-square test does not show statistical significance, returning a high p-value of 0.4174, therefore, indicating poor goodness of fit for the model in respect of EBITDA margin as a dependent variable.

Listing Status and Hospital Performance

Over the study observation period, the regression model results indicate that, at a level of significance of 1%, Listing Status is demonstrated to strongly explain hospital operator performance ("Performance") in terms of Total Annual Revenue for our sample private Hospital Operators in South Africa, with an estimated coefficient of determination in the model computed as 3.009 and the estimated relationship is shown to be positive. Listing, therefore, is shown to have a positive and statistically significant relationship with Performance in terms of Total Annual Revenue. Turning to Performance but using the performance indicator of Revenue per Bed per Day, the model's positive regression coefficient estimated at 0.607, and the associated statistical significance level of 1%, reveals that Listing Status contributes positively and with statistical significance to performance indicator of Revenue per Bed per Day over the study period. The model results further indicate a statistically significant positive relationship between Listing and Hospital Bed Numbers, with a computed coefficient of determinant of 2.402 at a statistical level of significance of 1%. Listing, therefore, is demonstrated to also be a significant determinant of Hospital Bed Number, one of the study's four indicators of Performance

Table 15: Seemingly Unrelated Regression Output

Dependent Variables:	**BEDS**	**EBITDA**	**TREV**	**REVBDAY**
	Coef.	*Coef.*	*Coef.*	*Coef.*
Constant	3.089***	2.516***	-	4.827***
	(0.752)	(0.618)		(0.753)
LISTING	2.402***	0.060	3.009***	0.607***
	(0.094)	(0.062)	(0.112)	(0.062)
MEDINS	0.413***	0.046	0.759***	0.345***
	(0.082)	(0.067)	(0.022)	(0.081)
HCINF	-0.001	0.022	-0.023	-0.022
	(0.025)	(0.017)	(0.026)	(0.018)
R-squared	0.9406	0.0143	0.9469	0.7607
χ^2	694.46***	2.84	32334.78***	128.42***
Prob>χ^2	0.000	0.4174	0.000	0.000
Parameters	3	3	3	3
RMSE	0.266371	0.1726717	0.3198714	0.1725845
Observations	40	40	40	40

Notes: BEDS=Total number of hospital beds; EBITDA= Earnings before interest and tax, depreciation and amortisation; TREV= Total Revenue; REVBDAY= Total revenue per bed per day; MEDINS= Medically insurance population (%); HCINF=Healthcare inflation (%). *** denotes significance at 1%.

The results in Table 15 above indicate a statistically significant positive relationship between Listing Status and Performance. These findings are in line with IPO literature that posits that institutional and contextual characteristics of public bourse listing confer advantages that impact firm performance (Allen, 1993; Jensen, 1989; Pagano et al., 1998). The above findings also find support in the work of Schoubben and Van Hulle (2008) in Continental Europe whose research demonstrated that listing, or more specifically the stock market environment, via its positive impact on the "determinants of firm performance- product market competition, financial pressure, and form of corporate control-" was beneficial to firm performance. These researchers assert that the impact of driver functioning on performance is dependent on whether

a firm is listed or not, or more specifically, that listing enhances the performance of quoted firms and is not shown to enhance the performance of unquoted firms.

The 0.006 regression coefficient of Listing Status in the determination of the relationship between Listing Status and performance measure of EBITDA margin, although positive, was not statistically significant any of the 1%, 5%, nor 10% levels of significance. Listing Status, therefore, is not demonstrated by a key variable in determining the operating efficiency component of Performance as measured in terms of reported EBITDA margin, for the sample of South African private Hospital Operators over the study observation period from 2009 to 2017. This SUR model finding of a statistically insignificant, and positive, relationship between Listing Status and operational efficiency is in line with the descriptive statistics analysis that showed that, notwithstanding, the advantage of listed operators in terms of performance measures of higher Total Annual Revenues Hospital, Revenue per Bed per Day and Hospital Bed Numbers, the listed Hospital Operators do not demonstrate superior performance in terms of operating efficiency.

The cost (operating) efficiency of for-profit private hospitals remains an ongoing debate in healthcare literature. The lack of efficiency of for-profit private hospitals is highlighted by Woolhandler and Himmelstein (2004) who assert that profit maximisation and not cost minimisation defines the strategic position of investor-owned private hospitals. The researchers, as highlighted in the literature review above, go further and "posit that these two strategic positionings are almost mutually exclusive, further contending that certain strategies that bolster profitability often worsen efficiency and drive up costs, such as high administrative costs and high CEO incomes, and that those strategies aimed at reducing costs, such as spending less on nursing care, often lower quality of care" (p. 1819). It was further found that total hospital costs, driven mainly by rising administrative costs, were also higher at for-profit hospitals (p. 764). Whilst drawing on this research, it is prudent to stress that, unlike this study whose focus is to compare listed against unlisted private hospital performance, Woolhandler and Himmelstein's (2004) study was comparing for-profit against not-for-profit private hospitals. To bring the discourse back to the listed versus unlisted firm performance, it is instructive to note IPO literature and work by, inter alia, Jensen (1989), Alexander and Mayer (1991) and Myers (2000) that pointed to agency problems, hence costs associated with going

public, as conferring potential disadvantage to firm performance.

Medically Insured Population and Hospital Performance

Medically Insured Population growth, a measure of the private medical patient population in South Africa, was found to have a statistically significant positive relationship with Performance in terms of Total Annual Revenue and significant, up to 1% level, in explaining this indicator of performance. The model, in turn, estimates a positive coefficient of determination of 0.759 for this explanatory variable of performance. Further, the regression results indicate that Medically Insured Population, as an explanatory variable, is a statistically significant positive determinant of the performance indicator of Revenue per Bed per Day, with a significance level of 1% and an estimated coefficient of 0.345 for the selected hospital operator sample. The model also exhibits a statistically significant positive relationship, significant at 1%, between Medically Insured Population and Hospital Bed Numbers with an estimated coefficient of 0.413. The regression results, therefore, suggest growth in Medically Insure Population as a key variable in determining private hospital operator performance in terms of hospital bed growth in South Africa.

The results above indicate a statistically significant positive relationship between Medically Insured Population Growth and Performance. Specifically, it was highlighted above (see section 2.4 above) and as informed by the South African healthcare financing profile (Health Policy Project, 2016) that Medical Insurers' Expenditure on private hospitals in South Africa is a robust proxy for private hospital revenues, one of the study's four indicators of Performance. Therefore, given the SUR model result of positive relationship finding between medical insurance population growth and Performance, exploring the link between insurance development and economic growth becomes prudent. Researching the insurance-growth nexus in Europe, Haiss and Sümegi (2008) studied 29 European countries over a 14-year period to 2005 and concluded that there exists theoretical justification and some empiric evidence for the "insurance sector influencing economic growth, and vice versa". For European countries with higher levels of economic development, the research found a positive impact of life insurance on GDP growth, but for other study countries, being new European Union member states from lesser developed Central and Eastern Europe, found instead greater impact of liability insurance. However, Haiss and Sümegi (2008) contend that the effect of insurance on economic

growth is impacted, not only by the level of economic development but also by an important macro-economic variable of real interest rates.

In terms of EBITDA margin, the model estimates a coefficient of determination of 0.046 for the independent variable of Medically Insure Population. Whilst the finding demonstrates a positive relationship, it is not shown to be statistically significant at any of the 1%, 5%, nor 10% significance levels, respectively. Medically Insured Population, therefore, is not demonstrated to be a significant variable in determining the private hospital operating efficiency, as captured in EBITDA margin, in South Africa over the study observation period. However, work by Peleckienė, Peleckis, Dudzevičiūtė and Peleckis (2019) over the period from 2004 to 2015 of European countries belonging to the European Insurance Federation whilst also finding a statistically significant positive relationship in respect of the insurance-growth nexus in some countries, at the same time demonstrated negative relationship, and no relationship in other countries. Peleckienė et al. (2019) showed that as the economies of certain countries grow, measured by GDP per capita, penetration of insurance rises, and vice versa, whilst for some countries, a statistically significant negative relationship was demonstrated for the indicators of insurance development and economic growth. The remainder of the countries, however, demonstrated no relationship between insurance and growth. Going a step further to elucidate directionality, the researchers employed Granger causality testing. For the Netherlands, Malta, and Estonia, unidirectional causality was demonstrated from insurance to GDP, and for Luxembourg and Finland, unidirectional causality was from GDP to insurance. Further, bidirectional causality between insurance and economic growth was demonstrated for Austria, whilst no causality was evidenced for Slovakia. It is, therefore, evident from the aforesaid that further research is required; that causality may be unidirectional or bidirectional, and that the level of economic development is an important variable in the insurance-growth nexus.

Healthcare Inflation and Hospital Performance

The observation is made of a statistically insignificant negative relationship between Healthcare Inflation and Total Annual Revenue and again between Healthcare Inflation and Revenue per Bed per Day. In the regression determination of the performance indicators of Total Annual Revenue and Revenue per Bed per Day, the model's estimated parameters for

Healthcare Inflation are coefficients of -0.023 and -0.022, respectively. However, the above relationships are not demonstrated to be statistically significant at any of 1%, 5%, nor 10% level of significance, respectively, for determining performance in terms of the indicated dependent variables of Total Annual Revenue and Revenue per Bed per Day, alike. However, with a negative estimated coefficient determination of -0.001, Healthcare Inflation reveals a negative relationship with performance in terms of Hospital Bed Numbers, but the relationship is not demonstrated to be statistically significant

The results above indicate a statistically insignificant negative relationship between Healthcare Inflation and Performance. However, unlike the model's other three dependent variables above, the model's coefficient of determination of 0.022 suggests a positive relationship between Healthcare Inflation and EBITDA margin performance. Finally, in concert with the observed results for the other three indicators of Performance, the regression results have again not shown Healthcare Inflation to be a statistically significant determinant of performance in terms of operating efficiency, for the study's selected group of South African private Hospital Operators. Perusing South African private healthcare literature for the relationship, if any, between private hospital performance and healthcare inflation, the work of Erasmus and Kean (2018) provides some useful insights. Taking into account the fact that hospital revenue is fundamentally a function of both volume and price, where the price level is composed of healthcare inflation and headline inflation, Erasmus and Kean's research suggests that, after accounting for core inflation and medical insurance beneficiary numbers, hospital price inflation is not a key driver of Medical Insurance Expenditure (Medical Scheme Expenditure). This assertion, against an industry background of Medical Scheme Expenditure being a proxy for private hospital revenue performance (see section 2.4 above), would imply that Healthcare Inflation (Private Hospital Inflation) is not a key driver of rising Medical Scheme expenditure on private hospitals.

The study suggests, therefore, that the key driver of Medical Scheme expenditure on private hospitals, hence the most important driver of hospital revenue performance, is increased consumption, or utilisation, of private hospital services by Medical Scheme members and not healthcare (hospital) inflation.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter concludes the research study on the relationship between performance and Johannesburg Stock Exchange listing of selected South African private Hospital Operators between 2008 and 2017. Based on the results obtained in the previous chapter, it covers the summary of the study, draws conclusions, gives policy recommendations, and proffers future avenues of research.

6.2 SUMMARY AND CONCLUSION OF THE STUDY

Following a review of literature on the evolution of the private health sector, competition in the health sector, determinants of corporate performance and stock market listing impact on the drivers of corporate performance, a regression model that links Listing Status on the JSE and private hospital performance was specified. Recognising that other independent variables could impact firm (private hospital) performance, two control variables of Healthcare Inflation and Medically Insured Population, respectively, were added to the regression model to enhance the model's explanatory power and minimise the load on the model error term. At the same time, pairwise correlation analysis was performed on the model's resultant three explanatory variables and, prudently, multicollinearity was ruled out.

The model's selected indicators of performance were Total Annual Revenue, Revenue per Bed per Day, Hospital Bed Numbers, and EBITDA margin. The primary specified regression equation was then expanded to include four simultaneous equations for the four indicators of hospital performance. The study, therefore, employed the Seemingly Unrelated Regression Model, a system of simultaneous equations that regressed three independent variables of Listing, Medically Insured Population and Healthcare Inflation against the indicators of performance.

The model showed goodness of fit for all performance indicators with R-squared values over 0.76 and the Chi-square test showing statistical significance at 1% with p-values of 0.000,

except for EBITDA margin performance which demonstrated poor goodness of fit. This implies that the model explains the variability in the performance indicators of Total Annual Revenue, Revenue per Bed per Day, Hospital Bed Numbers, but not EBITDA margin.

Descriptive statistics performed revealed higher Total Annual Revenues generated, superior Hospital Bed Numbers, and higher Revenue per Bed per Day commanded by the JSE-listed hospital operator group, underscoring their market share strength, but this dominance which was confirmed as high market concentration by the Competition Commission (2019), was not translated into superior operational efficiency. Indeed, the JSE-listed hospital operator group and the unlisted peer proxy, Lenmed, retuned almost similar average EBITDA margin performance over the 10-year study period to 2017 of 22.62% and 21.95%, respectively.

The study revealed a positive relationship between Listing Status and performance. Although Listing Status also revealed a positive relationship with the performance indicator of operating efficiency as measured by EBITDA margin, this relationship was not statistically significant. Therefore, save for operational efficiency, the status of being listed on the JSE was shown to have a statistically significant positive impact on all performance indicators. The Listing Status coefficients were highly significant at a 1% level of significance for Total Annual Revenues, Hospital Bed Numbers, and Revenue per Bed per Day, indicating that Listing Status had a significant positive effect on performance, except for operating efficiency. The study, concludes that, save for operating efficiency, Listing Status on the JSE appears to be beneficial on the performance of listed South African Hospital Operators compared to their unlisted peers.

Notwithstanding that the underlying annual covered population growth rate has been declining, total Medical Scheme beneficiary numbers rose steadily between 2008 and 2016 from c7.87 million members to c8.88 million members as already discussed under section 2.4 above. This growth in the Medically Insured Population was found to have a statistically significant positive relationship with the performance, revealing coefficients up to 1% significance level for the performance indicators of Total Annual Revenues, Hospital Bed Numbers, and Revenue per Bed per Day, respectively. The determined positive relationship with operating efficiency, EBITDA margin, was however not significant. The study concludes, therefore, that Medical Insurance development, as measured by Medical Insurance Beneficiary Population growth has

a positive effect on performance, but this impact is not significant in terms of operating efficiency.

Against the background of a conclusion by the Competition Commission's Health Market Inquiry of a highly concentrated national private hospital market in South Africa, as discussed in section 3.2.2, an important finding of the study was that the macroeconomic variable of Healthcare Inflation did not show a statistically significant relationship with any of the performance indicators. Also, the underlying relationship with performance, though not statistically significant, was indeed negative for Total Annual Revenues, Hospital Bed Numbers, and Revenue per Bed per Day, respectively, but positive with operating efficiency. This finding, and without inferring directionality, would not seem to support an argument for rising healthcare inflation being linked to improved financial performance, at least not in an oligopolistic market with suggested dominance by private hospitals where the Health Market Inquiry concluded that moderate concentration exists at a national level in the South African private hospital market (Department of Economic Development, 2019). It could also be that structural consideration in the private healthcare labour market means that rising healthcare inflation impacts private hospitals' profit and loss statements disproportionately on the value add, being cost lines, rather than on the top line as expressed in hospital prices and revenues. This is, as some researchers have submitted, hospital price inflation is driven more by the industry dynamics where "hospital input items, for example, nurse wages, increase at rates higher than the headline CPI basket cost line" (Erasmus & Kean, 2018, p. 3).

6.3 POLICY RECOMMENDATION OF THE FINDINGS

This study makes a contribution to the funding mobilisation debate by examining whether or not Listing Status impacts the performance of private Hospital Operators in South Africa. This has implications for the mobilisation of investment capital into the private hospital space, long-term managerial decision-making, and corporate growth strategies.

Given that the study suggests that expected improved performance is associated with Listing Status, a clearly articulated and executable growth strategy underpinned by the goal to ultimately trade as a quoted firm on the public bourse becomes a strategic imperative for unlisted industry incumbents or new entrants seeking to attract long-term capital investment.

Whilst evolution to a listed status would suit long-term debt capital funders with their stringent credit risk mitigation requirements of information richness and transparency afforded by public trading, for equity capital investors, the unlisted hospital operator groups would need to craft and position their value proposition for the patient capital real asset investor whose investment thesis would be significantly enhanced by the value uplift promised by conversion to a listed status.

Considering the research finding of a positive relationship in terms of the medical insurance-private hospital performance nexus, and factoring in the very important macro-economic contribution of the private hospital sector to GDP and employment, the implication for policy makers is that it is imperative that interventions to leverage economic development through universal health coverage policy and the creation of attendant universal health funds must also embrace – or at least not be to the exclusion of – the development of the private health insurance due to the potential impact of private insurance development on economic growth, and ultimately, performance of the private hospital (healthcare) sector.

Finally, the listed hospital groups should strive to **improve their cost efficiencies** given their dominance and implied ability to leverage economies of scale. The inability to manage input costs, as compared to their smaller and less-resourced unlisted peers, may lend some credence to the Competition Commission's assertions of undesirable concentration that is seen as a driver of **Medical Scheme expenditure inflation** which has the potential to erode social welfare and ultimately translates to increasing Medical Scheme insurance premiums.

6.4 LIMITATIONS OF THE STUDY AND AVENUES FOR FUTURE RESEARCH

The study focused on selected enterprise variables of performance and whether these are affected by the JSE Listing Status. These variables, whilst very important, are fundamentally financial, therefore, do not encompass a very important performance variable for the hospital sector, that is, Quality of Care. Two important avenues for future research in the South African private hospital sector would, therefore, be the exploration of the Listing-Quality Nexus-impact of listing on quality of care and healthcare outcomes, and the Quality-Performance Nexus: the relationship between quality of care and performance.

Also, the study whilst selecting healthcare inflation, a component of total inflation, may have omitted other important macro-economic variables, such as formal employment, which may have a bearing on private hospital performance. As most formal employment in South Africa comprises the benefit of medical scheme coverage, and whilst the study employed the explanatory variable of medical scheme covered population, the relationship between formal employment and private hospital performance provides an area of possible future research.

Limited public availability of financial and performance data of unlisted private hospitals, evidenced by public availability only of the Lenmed Group's data, and the employment of aggregation of the unlisted private hospitals in the form of National Hospital Network data confer self-selection bias to the study and future study is recommended to explore this bias further.

Finally, whereas the study employed Medically Insured Population as a control variable, and an important finding of a highly significant relationship of this control variable with performance was evidenced, future studies should investigate the Private Medical Insurance-Private Hospital Sector Growth Nexus more formally and employing a wider breadth of private healthcare insurance to include "quasi-insurance healthcare products" that fall outside the ambit Medical Schemes Act.

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