A fair return for risk?

An examination of structure, competition and profitability in the market for private finance in the National Health Service

By

Mark Hellowell

This thesis is submitted in fulfilment of the degree of Doctor of Philosophy, University of Edinburgh

Global Public Health Unit
Social Policy
School of Social and Political Science
University of Edinburgh

Title: A fair return for risk? An examination of structure, competition and profitability in the market for private finance in the National Health Service.

Abstract

Since 1993, the Private Finance Initiative (PFI) has been the dominant form of large-scale infrastructure procurement used by National Health Service (NHS) organisations in the United Kingdom. As of April 2011, 123 PFI projects for new hospital facilities had been agreed between NHS organisations and private sector consortia, representing privately financed investment of £15.9 billion (in 2010 prices), and a projected long-term cost to the NHS of £70.5 billion. Eight additional hospital PFI schemes were being procured or prepared for tender as of April 2011, with an estimated capital investment value of £2 billion.

Despite the financial significance of PFI projects to the NHS, the literature has not assessed whether, or the extent to which, the returns expected by investors are excessive. This gap in the evidence base is highly problematic. The presence of excess returns to investors will have an impact on the cost efficiency and affordability of PFI projects, and consequently the financial sustainability of the NHS organisations that pay for them. This thesis evaluates the returns that investors in NHS-commissioned PFI projects expect to earn with reference to the scale of risk being borne by these investors, and explores the sources of the identified excess via an examination of the structure and competitiveness of the PFI financing markets.

The study therefore comprises two substantial empirical components. The first draws on the financial models of 11 NHS PFI projects to describe and evaluate the return to investors. Cost of capital benchmarks, constructed on the basis of the Capital Asset Pricing Model, are used as comparators to assess the Internal Rate of Return (IRR) for the 11 projects, and as discount rates to calculate Benefit-Cost Ratios. Both measures agree on the presence of significant excess returns for investors on each project – with large "spreads" between the IRRs and the corresponding cost of capital benchmarks, and high Benefit-Cost Ratio scores.

The second empirical component provides an analysis of the structure and competitiveness of the market for private finance. Two indicators of this market's structure – concentration and entry/exit rates – in addition to the dynamics of the procurement process are the focus of measurement and evaluation. It is demonstrated that: (a) the market for private finance in this sector is an oligopoly, (b) market share is highly concentrated when assessed against UK regulatory standards, and (c) churn and market penetration rates are extremely low. Constraints on the competitiveness of the market are identified as: (i) the low number of bidders; and (ii) the extensive period of non-competitive bidding in the final phase of the procurement process, in which the output specifications of projects are materially altered.

The thesis concludes that recent reforms to the procurement process have been ineffective, and the problems underpinning a lack of competitive pressure in procurement may be insuperable, given the inherent complexity of this form of investment and the need to secure external financing. For the NHS, this source of cost inefficiency implies substantial *opportunity costs* (i.e. foregone opportunities for additional capital investment) and *excess costs* (i.e. a higher than necessary burden on the revenue budget). A stronger regulatory regime, incorporating regulation of the profitability of PFI projects for investors, is required to minimise the threat posed by this policy to the financial sustainability of the NHS.

Acknowledgements

This thesis would not have been possible without the support and guidance of a number of colleagues and other individuals whose contribution I would like to acknowledge. First and foremost, I would like to thank my supervisor Jeff Collin, who has contributed hugely to my personal and professional development while providing the support and encouragement I needed to complete the thesis at the same time as working as a full-time lecturer. I would also like to thank my second supervisor Iain Hardie, now a lecturer in politics but previously a banker, for his crucial insights into financial practice. My colleague Sarah Hill has been a tremendous source of support and advice, and this has been especially invaluable in the last two years of researching and writing. Former colleagues Allyson Pollock and David Price were also influential sources of guidance in the early phases of planning this research study.

Outside the University of Edinburgh, a number of people have provided specialist expertise without which a multi-disciplinary project of this type could not have been undertaken. In particular, I would like to acknowledge the contribution of Robin Milne, formerly of the Department of Economics at the University of Glasgow, who acted as co-supervisor in the early years of the PhD before retiring in 2009. His expertise on the applicability on competition theory to the NHS context was invaluable in framing the current project. Two academics at the University of Boccóni, Milan - Veronica Vecchi, lecturer in health care management and Stefano Gatti, professor of finance - worked with me on papers which apply the techniques of financial theory and practice to evaluate public private partnerships, and I would like to acknowledge the contribution of their work in shaping parts of the study.

I would like to thank my mother, Barbara, who provided extraordinary support with family and other commitments at critical periods in the data collection and writing processes. Finally, I would like to thank my partner, Alice, for exceptional patience and constant support throughout the project. This thesis is devoted to our three children, George, Carys and Jack.

Mark Hellowell
University of Edinburgh
27th August 2012

List of acronyms and abbreviations

BAFO Best and Final Offer. The final stage of bidding prior to the selection of a preferred bidder. BAFO bids contain detailed responses to the output specification and prices.

BCR Benefit-Cost Ratio. A measure of an investor's expected return. The ratio of the present value of the revenue cash-flows to the present value of the initial investment.

CAPM The Capital Asset Pricing Model. A method of measuring the opportunity cost of capital for an equity investor.

CRn Concentration ratio. A measurement of the concentration of market share among an industry's largest n firms.

DBFO Design, Build, Finance and Operate. A technical term for the project finance model as used within the PFI programme in the United Kingdom (see 'PFI' below).

DSCR Debt Service Cover Ratio. The ratio of the cash-flows from the project against scheduled debt service.

FBC Full Business Case. A document drafted by public authorities in order to secure the support of ministers for a proposed PFI project prior to signing contracts with a preferred bidder.

FCFBE Free Cash Flow to Blended Equity. The cash available per period after payment of all operational costs and after making scheduled payments of debt interest and principal.

FCFP Free Cash Flow to the Project. The cash available per period after payment of all operational costs but before making scheduled payments of debt interest and principal.

ERP Equity Risk Premium. The minimum amount of money by which the expected return on an investment must exceed the return on a risk-free asset in order to attract investment.

EMRP The average return on the market portfolio of risky assets over a defined period.

IRR Internal rate of return. The rate of return on an investment calculated as the discount rate that brings the present value of a stream of projected cash-flows to zero.

ITN Invitation to Negotiate. An invitation to bid in a public procurement.

HI Herfindahl Index. A measure of the market share of firms in relation to the industry as a whole. Used as an indicator of the amount of competition between firms in a market.

NHS National Health Service. The shared name of three of the four publicly financed health care systems of the United Kingdom.

LIBOR The London inter-bank offered rate. A floating interest rate that is used by banks and other financial institutions to price a large number of assets.

NAO The National Audit Office. The supreme audit institution of the United Kingdom.

NPC Net Present Cost. The NPV (see below) of the whole-contract cost of the PFI to the public authority.

NPV Net Present Value. The discounted present value of a stream of future cash-flows, offsetting benefits against costs.

OFT Office of Fair Trading. The supreme competition regulator in the United Kingdom.

OJEU *Official Journal of the European Union*. An online publication in which all PFI contracts must be tendered.

OBC Outline Business Case. A business case drafted by public authorities in order to secure the support of ministers for a proposed PFI project prior to tendering.

PFI Private Finance Initiative. The term given to contracts based on project finance principles, in which revenues are sourced from the contracting authorities involved.

PPP Public-private partnership. A generic term used for various forms of public-private sector contracting, of which PFI is one example.

PSND Public Sector Net Debt. A stock estimate of the financial liabilities issued by the public sector in the United Kingdom, less its holdings of liquid financial assets.

PUK Partnerships UK. A part-private sector company tasked by the British government to promote and implement public-private partnerships between 2000 and 2010.

RPI The Retail Prices Index. A measure of inflation.

SoPC *Standardisation of PFI Contracts*. The standard form contracts for PFI deals in the United Kingdom.

SPV Special Purpose Vehicle. A legal entity with no activities other than those connected with its borrowing.

TCE Transaction Cost Economics. A branch of institutional economics established by Oliver Williamson.

WACC Weighted average cost of capital. The weighted average of the costs of a company's equity and debt.

Table of Contents

1. Introduction 1

1.1 Background to the research 1

1.2 The Private Finance Initiative (PFI) 8

1.3 The National Health Service: structure and reform 11

1.4 Rationale for the research 15

1.5 Structure of the thesis 25

2. The use of PFI in the NHS 29

2.1 Introduction 29

2.2 The financial reporting of PFI transactions 30

2.3 The scale and significance of the PFI programme 33

2.4 Private finance in the NHS: history and prospects 35

2.41 The PFI under the coalition government (May 2010-) 44

2.5 Conclusion 49

3. PFI in the NHS: procurement, contracts, cash flow and risk 51

3.1 Introduction 51

3.2 The procurement process 52

3.3 The special purpose vehicle 60

3.31 Sources of finance 61

3.32 SPV project tasks 63

3.33 SPV revenue 64

3.34 The distribution of cash-flow 66

3.35 Reserve accounts 66

3.4 Financial dynamics 67

3.41 Cash draw down and allocation 68

3.42 Senior debt – draw-down and repayment 69

3.43 Equity – draw-down and repayment 70

3.44 Refinancing 71

3.5 Risks borne by equity and debt investors in the SPV 72

3.51 Contract price and the magnitude of risk borne by equity investors 72

3.52 Project-specific risk 74

3.53 Systematic risk 80

3.54 Credit default risk ... 83
3.6 Conclusion ... 86
4. Theoretical framework ... 89
4.1 Introduction ... 89
4.2 Investor returns and market structure ... 89
4.3 Oligopoly and the PFI procurement process ... 92
4.4 Competition and excess returns ... 99
4.5 Measuring the return ... 105
4.6 Conclusion ... 112
5. The PFI's economic performance: a review of the empirical evidence ... 115
5.1 Introduction ... 115
5.2 The claimed benefits of private finance in project delivery ... 117
5.21 Risk, reward and the incentive structure facing providers of capital ... 118
5.22 The cost of private finance ... 119
5.23 Reducing cost and time overruns ... 120
5.24 A "whole-life" approach to construction and maintenance ... 121
5.25 Long-term performance management ... 122
5.3 Methodology ... 123
5.31 The search ... 123
5.32 Search terms ... 125
5.33 Exclusion/inclusion criteria and process ... 126
5.4 Results of the literature review ... 129
5.41 The return to private investors ... 129
5.42 Design and build ... 139
5.43 Service provision ... 146
5.5 Conclusion ... 149
6. Methodology ... 151
6.1 Introduction ... 151
6.2 Identifying the cash flows and measuring the return ... 151
6.21 Data sources ... 151
6.22 Data collection ... 153
6.23 Description of the data ... 158
6.24 Selection of cash-flows ... 159
6.25 Description of the data set ... 163

6.3 Market structure and competitiveness 166
6.31 Data collection: concentration and entry/exit dynamics 166
6.32 Selection of concentration measures 169
6.33 Selection of entry/exit and penetration measures 173
6.34 Data collection: the procurement process 175
6.4 Limitations 177
6.5 Conclusion 181
7. Evaluating the return to investors 183
7.1 Introduction 183
7.2 Approach to the analysis 183
7.21 The benchmark cost of blended equity 184
7.22 The benchmark cost of debt 196
7.23 The Weighted Average Cost of Capital 200
7.3 Results 203
7.31 Comparing Blended Equity IRRs and cost of blended equity benchmarks 203
7.32 Comparing Project IRRs and Weighted Average Cost of Capital benchmarks 204
7.33 Benefit-Cost Ratios on Free Cash Flow to Blended Equity 206
7.34 Benefit Cost Ratios on Free Cash Flow to the Project 208
7.35 Interpretation of results 211
7.4 Considering the representativeness of these findings 214
7.41 The representativeness of the return on Blended Equity 217
7.42 The representativeness of the return on the Project 220
7.5 Conclusion 223
8. Market structure and competitiveness 227
8.1 Introduction 227
8.2 Approach to the analysis 228
8.21 Market definition 228
8.22 Evaluating market concentration 231
8.23 Evaluating the market's entry and exit dynamics 233
8.24 Evaluating the competitiveness of the procurement process 234
8.3 Results 238
8.31 Concentration 238
8.32 Cumulative market shares and n-firm concentration ratios 240
8.33 Entry, exit rates, churn and market penetration 253

8.34 The procurement process ... 258
8.4 Interpretation of results ... 268
8.5 Conclusion ... 272
9. Conclusion ... 273
9.1 The main findings of this thesis ... 273
9.2 Excess returns, efficiency and health system sustainability ... 274
9.3 Implications for global health systems and population health ... 278
9.4 The sustainability of excess returns on equity and debt ... 281
9.5 Strategies for reducing the excess return to PFI investors ... 289
9.51 Competition for the market – the procurement process ... 289
9.52 The need for regulation ... 290
9.6 Final word ... 295
9.7 Future research priorities ... 296
Appendix A: The distribution of cash flow (FCFBE & FCFP) on each project ... 303
Appendix B: Exploring the financial dynamics of the 11 data set projects ... 315
Appendix C: the impact of refinancing on blended equity and project cash flows: the case of the Norfolk and Norwich PFI hospital ... 321
REFERENCES ... 323

List of figures and tables

List of figures

Figure 1.1 Total health expenditure per capita, public and private, 2009 ... 6

Figure 2.1 Number / capital value of PFI contracts for hospital projects reaching financial close per calendar year (1997-2010) ... 34

Figure 2.2 Unitary charge payments for fiscal years 1996/97 - 2047/48 for all NHS PFI projects signed in the UK as of March 2011 ... 35

Figure 2.3 Number & capital value of PFIs in procurement (March 2011) ... 46

Figure 2.4 Actual/ projected public sector net debt as % of GDP ... 47

Figure 2.5 Actual /projected public sector net investment as % of GDP ... 48

Figure 3.1 The PFI procurement process: pre-and post-January 2006 ... 54

Figure 3.2 The structure of a typical PFI hospital contract ... 64

Figure 3.3 The cash-flow “waterfall”, from the unitary charge to equity distributions ... 66

Figure 3.4 Draw-down/ allocation of cash on a generic hospital PFI ... 68

Figure 3.5 Equity draw down and cash-flow in detail ... 71

Figure 5.1 Algorithm for inclusion of studies identified by bibliographical databases and internet searches ... 127

Figure 6.1 Sandwell and West Birmingham - capital expenditure, revenue, Free Cash-flow to the Project, payments to senior debt, and Free Cash-flow to Blended Equity ... 161

Figure 7.1 Pre-tax Blended Equity IRR versus the benchmark cost of blended equity benchmarks (higher/lower equity risk premium) ... 202

Figure 7.2 Post-tax Project IRR versus the benchmark base case Weighted Average Cost of Capital (higher/lower equity risk premium) ... 203

Figure 7.3 Post-tax Project IRR versus the maximum and minimum Weighted Average Cost of Capital benchmarks ... 204

Figure 7.4 Pre-tax Blended Equity IRRs of NHS PFI contracts signed between 1997 and 2010 (n=77/ 123); and gross yield on long-dated UK government gilts ... 216

Figure 7.5 Post-tax Project IRRs on NHS PFI projects reaching financial close between July 1997 and February 2010, and rate on long-dated interest rate swaps ... 219

Figure 8.1 Mean procurement periods for UK PFI hospitals (n=107) 257

Figure 8.2 Proportion of projects attracting two or fewer bids at FITN 261

Figure 9.1 Interest rates: gilts vs. PFI debt (Jan 2008-Feb 2010) 283

Figure A1. North Cumbria: projected free cash-flow to blended equity 301

Figure A2. North Cumbria: projected free cash-flow to the project.. 301

Figure A3. Norfolk & Norwich: projected free cash-flow to blended equity 302

Figure A4. Norfolk & Norwich: projected free cash-flow to the project 302

Figure A5. County Durham & Darlington: projected free cash-flow to the project 303

Figure A6. Hairmyres: projected free cash-flow to blended equity 304

Figure A7. Hairmyres: projected free cash-flow to the project 304

Figure A8. Wishaw: projected free cash-flow to blended equity 305

Figure A9. Wishaw: projected free cash flow to the project 305

Figure A10. Edinburgh: projected free cash flow to blended equity 306

Figure A11. Edinburgh: projected free cash flow to the project 306

Figure A12. Nottingham: projected free cash flow to blended equity 307

Figure A13. Nottingham: projected free cash flow to the project 307

Figure A14. Hull & East Yorkshire - projected free cash flow to blended equity 308

Figure A15. Hull & East Yorkshire - projected free cash flow to project 308

Figure A16. East/North Herts: projected free cash flow to blended equity 309

Figure A16. East/North Herts: projected free cash flow to the project 309

Figure A17. Sandwell & West Birmingham: free cash flow to blended equity 310

Figure A17. Sandwell & West Birmingham: free cash flow to the project 310

Figure A18. Hull & East Yorks (Oncology): free cash flow to blended equity 311

Figure A19. Hull & East Yorks (Oncology): free cash-flow to the project 311

Figure B1. NHS Lothian (Edinburgh): nominal unitary charge, project cash-flow and senior debt service costs 314

Figure B2. North Cumbria: unitary charge, project cash-flow and senior debt service costs 315

Figure C1. Free cash flow to blended equity: pre- and post-refinancing 320

List of tables

Table 3.1. Differences between equity and debt assets in financing a PFI project 62

Table 3.2 Project-specific risks retained by the SPV (after risk allocation to subcontractors) 80

Table 4.1 Illustrating the relationship between NPV and IRR..107

Table 4.2 The IRR and the impact of the opportunity cost assumption: an example 109

Table 4.3 The impact of the opportunity cost assumption on different cash-flow profiles...............111

Table 4.4 Illustrating the Benefit Cost Ratio method 112

Table 5.1 Theoretical benefits of the PFI capital structure..118

Table 5.2 Academic databases and websites used in the literature search 123

Table 5.3. Database and website search hits and the sifting process 126

Table 6.1 Contract duration, capital expenditure and IRRs (Equity and Project) for the 11 projects 163

Table 6.2 Uses and sources of capital raised for delivery of the 11 data set projects 164

Table 6.3 Number and capital value of projects in each period 168

Table 7.1 Risk premia used by PFI investors in portfolio valuation (2002-2009) 191

Table 7.2 Risk-free rates and cost of blended equity benchmarks for the 11 data set projects 194

Table 7.3 The cost of senior debt for 11 projects & sensitivity adjustments on credit margin...........198

Table 7.4 Average period-specific Weighted Average Costs of Capital – base case & adjustments....200

Table 7.5 Present values of blended equity expenditure and revenue, and Benefit-Cost Ratios of Free Cash-flow to Blended Equity..205

Table 7.6 Present values of capital expenditure and revenue, and Benefit-Cost Ratios of Free Cash-Flow to the Project..207

Table 7.7 Benefit Cost Ratios on Free Cash Flow to the Project – base case versus adjusted analyses..208

Table 7.8 Ranking projects by excess return: Benefit Cost Ratios versus the IRR-cost of capital

Spread 212

Table 7.9 Assessing “within-period” representativeness of excess returns to blended Equity 217

Table 7.10 Assessing “within-period” representativeness of findings on excess project returns....... 220

Table 8.1 Professional advisory firms involved in the bidding process for the North Middlesex Hospitals PFI project 233

Table 8.2 Number of investors per time period and in total 237

Table 8.3 Equity providers in the UK NHS PFI market (1997-1999): market share rankings 239

Table 8.4 Equity providers in the UK NHS PFI market (2000-2002): market share rankings 241

Table 8.5 Equity providers in the UK NHS PFI market (2003-2005): market share rankings 243

Table 8.6 Equity providers in the UK NHS PFI market (2006-2010): market share rankings 245

Table 8.7 Summary results for the n-firm concentration of the UK NHS PFI equity market 246

Table 8.8 Senior debt providers in the UK NHS PFI market (1997-1999): market share rankings.......247

Table 8.9 Senior debt providers in the UK NHS PFI market (2000-2002): market share rankings.......248

Table 8.10 Senior debt providers in the UK NHS PFI market (2003-2005): market share rankings.....249

Table 8.11 Senior debt providers in the UK NHS PFI market (2006-2010): market share rankings.....250

Table 8.12 Summary results for the n-firm concentration of the UK NHS PFI senior debt market 251

Table 8.13 Equity market (1997-2010): Entry, exit, turnover, churn and penetration rates...............253

Table 8.14 Senior debt market 1997-2010: Entry, exit, turnover, churn and market penetration rates 255

Table 8.15 The length of competitive procurement, non-competitive procurement and the process overall 259

Table 8.16 Public sector advisory costs, and advisory costs as percentage of capital value 260

Table 8.17 Mean number of bidders per period at each stage of competitive procurement............ 261

Table 8.18 Value of changes to output specification, proportion of the unitary charge represented by this value, and changes to contract length during the preferred bidder stage of negotiations..... 264

Table B1. Minimum and average ADSCRs and tail periods on the data set projects 317

1. Introduction

1.1 Background to the research

While a significant amount of research on health care financing has been produced in recent years, the major part of this focuses on the *revenue* side, and especially the public and private sector institutions through which resources for health care are collected, pooled and allocated (World Health Organization 2010; Kutzin 2008; Langenbrunner *et al* 2009). This thesis, however, deals with the *capital* side of health systems policy. Specifically, it focuses on the component of the health system that most persistently requires substantial and long-term capital investment – the hospital – in which the private sector plays an increasingly important role both in the UK and internationally (International Finance Corporation 2011).

There is a growing requirement for substantial investment in physical capital if the quality and financial sustainability of health systems are to be safeguarded. It is increasingly recognised that improving value through reforming health systems will be at the forefront of efforts to secure their sustainability in the face of technological progress and demographic change[1] (Thomson 2008). Enhanced pooling, better co-ordination of resource allocation, and the creation of incentives to enhance provider efficiency and responsiveness

[1] *Sustainability* has economic and fiscal components. Spending on health care is economically sustainable when it is lower than its opportunity cost – i.e. the benefits to society from allocating resources to health care are greater than those associated with equivalent expenditure on other valued goods or services. So long as the value produced by health care exceeds its opportunity cost, growth in health spending is sustainable in this sense. Concern regarding the *fiscal sustainability* of a health system relates to public expenditure on health care. Again, fiscal sustainability is determined by its opportunity cost. In the context of a fixed government budget, every pound spent on health means one pound less for spending on other areas of government responsibility. Fiscal sustainability is a problem when the government is unable to meet its health system obligations due to its inability or unwillingness to generate the revenue to meet these obligations, and under circumstances in which it cannot or will not further ‘crowd out’ other forms of spending (Thomson 2008).

are seen as important elements of such reform (Thomson *et al* 2009). Yet, in addition, health systems often have configurations of infrastructure that fail to maximise efficiency in the delivery of health services, thereby providing an opportunity to enhance sustainability without structural change. In much of Western Europe, for example, the composition of the health care estate is a consequence of historical investment patterns - e.g. the post-war expansion and extension of large general hospitals housed in pre-1900 buildings - rather than the outcome of any rational estate planning process (World Health Organization 2008).

One result of this is the inappropriate size of most hospital facilities. Recent research shows that while keeping the size and scope of a hospital large enough to exploit economies of scale (for example, in clinical expertise, infrastructure and technology), there is a size of facility at which efficiency starts to decline (World Health Organization 2010). Studies of the US and UK health systems indicate that inefficiencies start below about 200 beds and above 600, and that only a small minority of hospital facilities have levels of bed-provision within this range (Posnett 2002). In addition, as investments in high technology have taken priority over the facilities in which they are provided, many countries have seen a decline in the quality of health care infrastructure (Thompson and McKee 2004). This has led to an asymmetry between the rapid pace of change in technology and clinical practice, and the more incremental pace of change in hospital accommodation. The resulting "infrastructure gap" in the hospitals sector may pose a challenge to the long-term sustainability of some health systems and their capacity to maintain broad public support (Dowdeswell *et al* 2009).

The economic benefits of different financing methods can be evaluated against a number of different types of efficiency. For example, an evaluation of a financing mechanism's *cost* *efficiency* seeks to address whether this is providing a given output at a lower financial cost than the available alternatives, or is providing the larger output from allocated funds. An evaluation of a financing mechanism's *allocative efficiency*, in contrast, will address the extent to which the mechanism is producing the balance and type of goods that society prefers better than the alternatives (Sussex 2001). For a service such as health care, which has "merit good" characteristics (such that the social value of the service exceeds its market price) the quantity and quality of the service is an important determinant of allocative efficiency (Hellowell and Pollock 2010b). A loss in social welfare will arise if, by providing health care facilities via one form of financing rather than, the quantity or quality of goods produced is compromised, thus moving the economy away from its optimum (Reiss 2005).

This thesis is concerned with the cost efficiency of private finance in the delivery of new hospital facilities. From the perspective of the health care provider, the most cost efficient source of finance for a capital project is the one that carries the lowest interest rate. In most countries, funds can be borrowed by governments from the capital markets at a lower rate than is available to the private sector in those countries. Consequently, where the means of health care production are in government hands, public borrowing is commonly perceived as the most appropriate source of capital funds (Hellowell 2010). However, governments will often limit the volume of capital available to the health system, especially in the context of fiscal consolidation. The use of private finance may allow health systems that are constrained by an absence of public capital to deliver new infrastructure projects that would otherwise never materialise, or would materialise only with a substantial delay (Välilä 2005). In addition, there is an argument that private finance can offer cost efficiency benefits in the construction and operational components of a capital project (HM Treasury 2003b).

Specifically, the involvement of private sector funds may generate an incentive framework that leads to savings in delivery such that the higher financing cost is offset (Reiss 2005).[2]

Given the importance of capital financing for health care, there is considerable value in research that seeks to examine empirically the cost efficiency outcomes of financing methods. Improvements in the cost efficiency of capital financing reduces the adverse impact of investments on revenue (enabling resources to be re-allocated from capital to current budgets), and increases the resources available for capital projects that can enhance system efficiency. Conversely, where financing is cost *in*efficient, more resources must move from the provision of clinical services to infrastructure costs, and the potential for investment is curtailed. Cost efficiency is especially crucial in the delivery of hospital infrastructure due to the scale of the investments involved. In order to ensure that hospital projects are delivered as efficiently as possible, and enhance rather than compromise sustainability, it is vital that finance is obtained from the most cost efficient source, whether that is government, international lending organisations, or private investors (Sussex 2004).

The use of private finance in health system capital comes in many forms - involving both equity and debt.[3] Not surprisingly, the private sector is the dominant source of health care capital in the United States, but it is also prevalent in the Bismarckian systems of western Europe (Thiadens *et al* 2009). Private financing in the context of a health system based on

---

[2] Indeed, as is discussed in more detail in Chapter 5, economic theory predicts that the use of private finance is likely to result in an *excessive* focus by private sector parties on cost efficiency, such that the quantity and/ or quality of services is compromised (Hart 2003; Hart *et al* 1997; Reiss 2005). Thus, the benefits of private finance justify its expansion only when cost-efficiency is a higher priority than allocative efficiency (Reiss 2005).
[3] Equity is the form of capital which confers ownership of the physical asset and/or the returns that accrue to it. Debt is not an ownership interest in the firm, but entitles the holder of the debt to a contractually-defined stream of cash flows in the form of interest and repayment of the principal. An equity claim, on the other hand, entitles the holder of the claim to any cash flows left over after meeting all debt repayment obligations.

public funding and *public ownership*, in which capital planning and allocation remain largely in the hands of the state, is less common. However, a prominent example of equity and debt capital financing in this context is the Private Finance Initiative (PFI) which has been extensively used by the UK National Health Service (NHS) and is the subject of this thesis.

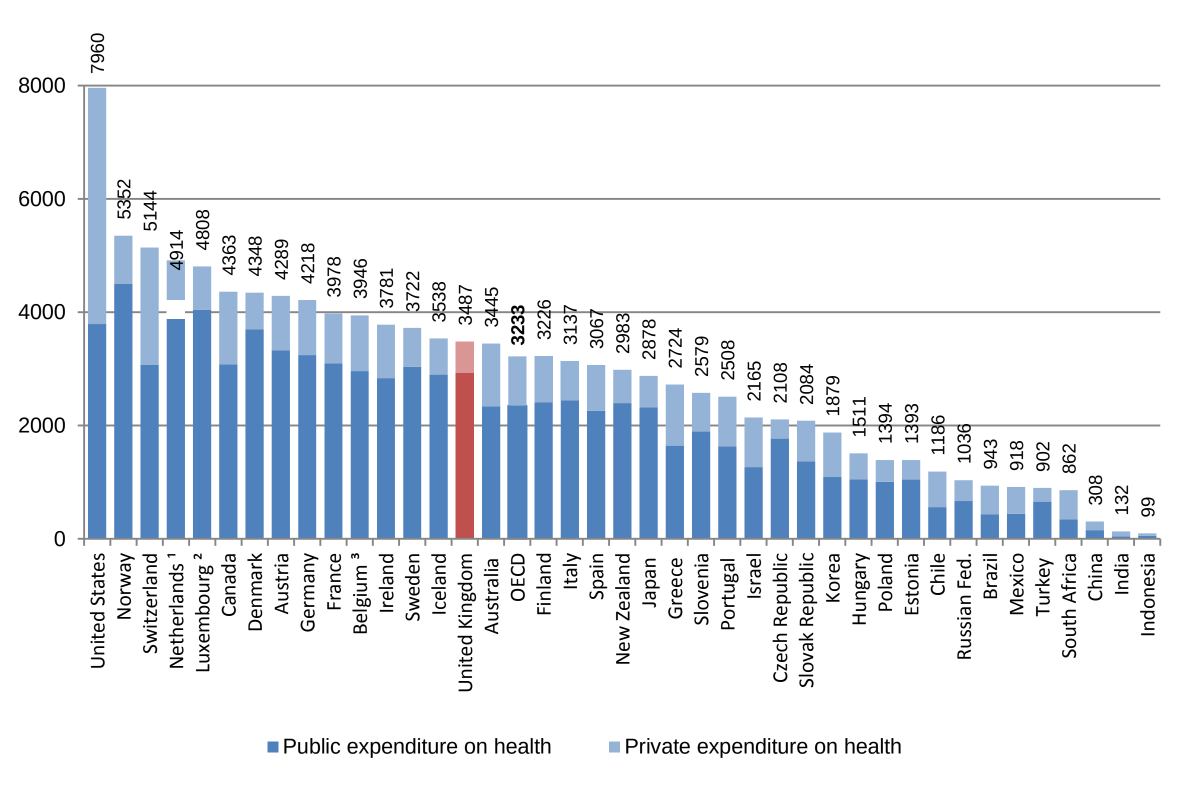
Despite two decades of market-oriented reform, the NHS remains (at the time of writing) a health system in which risk is pooled across the population and resources are allocated to health regions and/ or localities in accordance with population health need (Smith and Hellowell 2012). The NHS has avoided many of the inefficiencies and inequities associated with market financing, in which risk pools are formed by voluntary enrolment, leading to risk selection and segmentation (Hurley 2000). Indeed, the system's performance, in terms of cost efficiency and technical quality, has in recent years been good by European Union and developed world standards (Hollingsworth 2008). Although health care expenditure in the UK rose slightly above the OECD average for the first time in 2009 (see figure 1 overleaf), the additional resources have been matched by significantly better outcomes (OECD 2011).

For example, age-standardised death rates from amenable causes[4] for people aged 0 to 74 fell at a comparatively rapid rate, from 126.5 per 100,000 in 1997-98 to 82.5 in 2006-07, a reduction of some 34.8% (Nolte and McKee 2011). By way of comparison, per capita expenditure on the health system in the Unites States has risen at a similar rate to that of the UK (OECD 2011), but amenable mortality has fallen at the far slower rate of 21.5% (Nolte and McKee 2011). The widespread use of the Private Finance Initiative in the NHS

[4] Amenable mortality was defined by the authors as premature death before a certain age from causes that should not occur in the presence of timely, effective health care. The selection of causes of death considered amenable to health care is based on a previous systematic review by these authors (Nolte and McKee 2004).

provides an opportunity to assess the extent to which private *capital* financing supports or diminishes the efficiency- and quality-promoting features of this publicly owned system.

Figure 1.1 Total health expenditure per capita, public and private, 2009



Through the PFI, successive UK governments have encouraged the use of private finance (equity and debt) in delivering hospital infrastructure for the NHS while leaving hospital services in the public sector. The cost efficiency of this model of capital financing is determined to a significant degree by the rate of return that the providers of capital are able to earn on their investments. In turn, the cost efficiency of PFI is affected by its capacity to provide investments on which investors extract only *fair* returns. The presence of *excess* returns to investors damages the economic and fiscal sustainability of the NHS purchaser by

(a) exerting a greater than necessary burden on revenues; and (b) limiting the opportunities for additional investment that could enhance the cost efficiency of the system as a whole.

This thesis therefore aims to **(a) examine the cost efficiency of this method of capital financing, through an evaluation of the returns projected by equity and debt investors in NHS hospital PFI projects with reference to the magnitude of the risks being borne by these investors**, and **(b) explore the sources of any identified excess returns[5] by measuring the structure and competitiveness of the markets for PFI equity and debt investments.**

This aim incorporates a number of objectives. Specifically, the research intends to:

1. identify the financial and contractual features of the PFI model and assess their implications for the deriving “fair return” benchmarks for evaluating returns;
2. design a method for evaluating the fairness of returns targeted by PFI investors, in accordance with the features of the model identified via meeting objective 1;
3. design a method for determining the structure of the market for PFI investments, incorporating concentration levels, entry and exit dynamics, and penetration rates;
4. design a method for assessing the competitiveness of the market for PFI projects;
5. review the empirical evidence on the PFI model’s economic performance to date;
6. assess the implications of excess returns for the PFI model’s economic performance;

[5] Following the standard in finance and economics, the term “excess return” is used here to describe a return that is greater than that demanded by capital markets on investments with the same level of risk – i.e. where the return on an investment is greater than the opportunity cost of capital. See Chapter 4 for a full discussion.

7. using the methods designed in meeting the objective 2, assess whether the returns on investments in the PFI market reflect the risks borne by investors in producing the related output, or, conversely, contain premiums above this actuarially fair level; and

8. using the methods designed in meeting objectives 3 and 4, assess whether the structural characteristics of the markets for equity and debt finance, and the procurement process through which those characteristics are established, act to *promote* or *compromise* competition during the process of price determination.

In interpreting the policy implications of the findings generated through meeting objectives 1 through 8, this thesis incorporates a number of subordinate objectives, namely to:

9. consider the impact of the financial crisis on the returns targeted by PFI investors;

10. assess the implications of excess returns for the health system in England, in the context of the move to a fuller market in secondary and tertiary care provision;

11. assess the implications of excess returns for health systems in poor countries; and

12. identify strategies for eliminating excess returns, considering the potential for state regulation of investor returns and the specific form that such regulation might take.

1.2 The Private Finance Initiative (PFI)

Since 1993, the PFI has been the dominant form of large-scale hospital procurement used by NHS organisations in the United Kingdom. Under the PFI, various tasks relating to the development and operation of a new hospital building are contracted out as a single package to a consortium of private investors. Members of this consortium commit their own capital into the project, and raise finance from banks and/or the debt capital markets through issuing commercial paper (bonds). They manage the project's design and build, and supply maintenance and support services once construction work is completed. From this point, the project moves into the "operational" stage, and the NHS authority pays to the consortium a periodic "unitary charge". The level of this charge is set according to the consortium's operational costs (the costs of providing maintenance and services) and financial costs (the payments of principal and interest to creditors, and the return to equity). This payment is funded from the NHS authority's own revenue allocation (Hellowell 2010).[6]

This is different to the conventional public procurement model in which construction work is tendered independently of maintenance and service provision and the capital is provided by central government grants or loans (Hellowell 2010). These disbursements are financed from the government's own budget, which, in turn, is financed by taxation and/ or selling new government debt securities (gilts) in the capital markets. A distinctive feature of the PFI is the creation of a new company – a 'special purpose vehicle' – which is established with the sole purpose of delivering a specific project, financed by equity and debt, and funded

[6] The requirement for NHS organisations to fund the entirety of the unitary charge through their own resources is a distinctive feature of PFI's health sector. Projects undertaken by local authorities, for example, have received substantial revenue support from central government under the 'PFI Credits' regime. However, there have been various sources of subsidy from central government to support NHS organisations that pay PFI charges. These include the *smoothing mechanism,* introduced to address shortfalls in funding arising from different rates of capital depreciation between PFI and public assets; and *balance sheet support*, which was introduced for organisations that have had to pay additional charges accruing to their 'on-balance sheet' PFI assets. These funding sources were phased out in 2008/09. Under the current framework, introduced in 2006, all capital schemes (however financed) with a capital value greater than £25 million receive annual subsidy payments of 2.5% of scheme value, tapering over a minimum of five years and a maximum of 7 years from scheme completion (equalling 7.5% of capital value in total). Officially, this support is not designed to cover the costs of PFI, but to cover increased maintenance costs and double running costs (Hellowell and Pollock 2009).

almost entirely by a public sector revenue stream, with all revenues generated passed to corporate shareholders (the SPV's "members") or other creditors (Hellowell 2010).[7]

As discussed further in Chapter 2 of this thesis, the use of PFI is motivated by a number of financial and economic considerations. From a financial perspective, PFI enables investment to take place that is additional to the capital budgets of government departments and is excluded from the calculation of Public Sector Net Debt (PSND) - the principal measure of aggregate government borrowing (Hellowell 2010). Under conventional procurement, in contrast, there an immediate charge on the departmental capital budget and an increase to PSND from related borrowing. Thus, PFI enables the budgetary impact of investment to be "smoothed" over the period of the contract, in which the capital raised by the private sector is repaid, along with a rate of return, through paying the unitary charge. Consequently, the PFI enables more investment in the short term than strict adherence to formal allocated capital budgets would allow. However, there is an ongoing commitment to service the return to investors, which may constitute a significant call on resources (Hellowell 2011b).

From an economic perspective, the use of PFI has the effect of increasing the cost of finance (even in the absence of any excess returns) since the return earned on all forms of private finance is higher than that available to the government when it borrows directly on its own account (HM Treasury 2003b). In addition, the transaction costs associated with arranging private finance are higher than those associated with issuing gilts. However, as noted above, the use of PFI may deliver cost-savings in tasks such as construction, maintenance and service provision and thus offset the higher financing costs - including, potentially, the

[7] A small amount of SPV revenue – often less than 1% of the total - is generated through 'third party' activities, for example the leasing of space within the facility to commercial retail outlets (Hellowell and Vecchi 2012).

excess return. Thus, as is discussed in more detail in Chapter 5, there is a theoretical possibility that the ultimate cost to the NHS of using private finance may be lower than the alternatives - though this is much less likely in the presence of excess returns to investors.

As of April 2011, 123 hospital PFI projects had been agreed between NHS organisations and consortiums of private investors, representing investment in new health care capital of £15.9 billion in 2010 prices (HM Treasury 2011a).[8] Eight further hospital PFI schemes were being procured or prepared for tender as of March 2011, and these have an estimated combined capital investment value of £2 billion (HM Treasury 2011b). The annual revenue cost of NHS PFI schemes is currently estimated to be £2.3 billion (HM Treasury 2011a). However, the actual burden on the NHS revenue budget may be higher. Official estimates are based on projections made at the point of contracts signature, and are not updated post-contractually despite the evidence of systematic cost increases (Shaoul *et al* 2008).

1.3 The National Health Service: structure and reform

The National Health Service (NHS) is the shared name of three out of the four publicly funded health systems in the United Kingdom. Formally, the name applies only to the public health care system in England, the other three systems being *NHS Scotland*, *NHS Wales* and *Health and Social Care (HSC)* in Northern Ireland. All four systems share common characteristics. They are all financed from general taxation and provide care to the population free at the point of use. They each have a strong focus on primary care, with population-based General Practitioners, providing ambulatory care and acting as "gate

[8] This figure is produced by applying the relevant GDP deflator to the capital values recorded by the Treasury.

keepers" for hospital services. In each system, secondary care is provided largely within publicly-owned hospitals (though there is a small private sector in England and Scotland).[9]

The four health systems are, however, administratively distinct being politically accountable to the relevant national or devolved administration (namely the UK government, the Scottish government, the Welsh Assembly government and the Northern Ireland Executive). As a result, the UK has witnessed a number of different approaches to health system reform since devolution began in 1999 (Talbot-Smith and Pollock 2006), and many authors regard the policy and reform trajectories of the four systems as being divergent (e.g. Greer 2008).

Prior to 1991, funding for health care delivery across the UK was allocated to community-based Local Health Authorities, which were responsible for planning the provision of primary care and the management of hospitals. From 1991 the roles of purchaser and provider of hospital-based care were separated, with the intention of promoting competition between public hospitals, thereby establishing a 'quasi-market' in the NHS (Bartlett and Le Grand 1993). Local Health Authorities were given the task of buying hospital care on behalf of their population from incorporated publicly owned organisations called NHS Trusts. These Trusts competed for contracts from the purchasers on the basis of both price and quality. In 1997 the newly elected Labour administration retained the purchaser-provider split but reduced the scope of competition between Trusts and implemented longer and more cooperative relationships between purchasers and providers, with the

[9] In England, a number of 'Independent Sector Treatment Centres' carry out diagnostic and elective care to NHS patients. However, these accounted for less than 1% of hospital activity in 2008/09 (Gaynor et al 2010). In Scotland, there is one such centre, at Stracathro hospital. There are as yet none in Wales or Northern Ireland.

majority of contracts taking the form of annual bulk-purchasing contracts, based on global budgets and with little specificity in terms of the services being bought (Cooper *et al* 2010).

The publicly financed health systems in England, Wales and Northern Ireland have retained the purchaser-provider split since devolution. For example, in England, the bulk of the NHS budget (over 70%) is held by locally-based organisations called 'Primary Care Trusts', which provide primary care services and commission acute and specialist services from a variety of NHS (and, less frequently, independent) providers. In contrast, Scotland reverted in April 2004 to a traditional population-based planning structure with vertically integrated regional health boards operating under a single corporate body - the Scottish Department of Health (Talbot-Smith and Pollock 2006). In Scotland, all organisations providing services receive annual budgets, whereas hospital providers in England, Wales and Northern Ireland receive an "income" from commissioners which "purchase" their services. As a result, the degree to which hospital providers in these parts of the UK can be cross-subsidised by other levels of the system (e.g., to meet the revenue costs of large capital projects) is less than in Scotland.

This is especially the case in England, where the trajectory of reform has been strongly market-oriented since late 2002, when the UK government signalled a shift in policy and initiated a reform package with a set of phased-in changes leading to the re-introduction of competition from January 2006 onwards. One important strand of this has been a change in the way hospital providers - NHS and Foundation Trusts[10] - are paid under the contracts

[10] The concept of 'Foundation Trusts' was introduced in the 2002 government publication, *Delivering the NHS Plan,* and subsequently legislated for in the 2003 NHS Health and Social Care (Community Health and Standards) Act. Foundation Trusts are former NHS Trusts that have 'earned' the right to greater autonomy from central government by virtue of their perceived high performance in clinical and financial management. As 'public benefit corporations', they have more financial freedom and operational flexibility than NHS Trusts.

with purchasers. Prior to 2002, payment was on the basis of prospective global budgets, set according to the range of services to be provided. From 2002, a prospective *case-based* system - 'Payment by Results' (PbR) - has been introduced, under which providers are paid a fixed fee per 'finished treatment episode' (FTE), with the price set to equal the average cost of delivering the treatment across the NHS acute sector (Hellowell and Pollock 2009).

As with case-based payment structures elsewhere, the PbR framework is intended to increase the cost efficiency and clinical quality of hospital services. If providers are able to complete each FTE at a lower cost than the rate of the NHS tariff, they will earn a surplus (or a profit where providers are in the private sector), thus incentivising cost efficiency in the delivery of health care (Le Grand 2009). In addition, the system is likely to stimulate greater productivity, as providers that utilise fewer resources in completing FTEs will have additional capacity to treat more patients and thereby maximise turnover/ surpluses. As referral decisions are set to be increasingly determined by the choices that individual patients make,[11] such providers have an incentive to ensure that the services they offer will deliver good clinical quality in order to attract patients – or at least those elements of quality that are more readily observable by patients and/ or their commissioners (Propper *et al* 2006).

Under government legislation (the 2011 Health and Social Care Bill [re-committed]), all 152 Primary Care Trusts in England are to be abolished and their operational functions replaced

[11] *Patient choice* was introduced progressively from 2000, when the *NHS Plan* discussed the importance of patients being able to choose the date and time of hospital appointments and admissions. The 2002 publication, *Delivering the NHS Plan*, extended this concept to choosing the location of care (Talbot Smith and Pollock 2006). Initially this was introduced for patients waiting longer than six months for cardiac surgery, but since January 2006 all patients needing elective care have been offered a choice of five providers. Prior to the introduction of the patient choice concept, patients were referred by their GPs to the local hospital that provided the service they needed and were not generally offered choice over the location of their health care.

by groups of commissioning organisations led by NHS clinicians, with regulation of these commissioners provided by a central NHS commissioning board. Patient choice is to be significantly expanded, especially in relation to secondary care, with patients and GPs able to choose to purchase services from any willing accredited provider (whether in the public or private sector). Secondary care providers will be subject to EU competition law (Timmins 2010) and the scrutiny of an economic regulator, Monitor – which has hitherto been the financial regulator of Foundation Trusts. The new, re-committed, bill states that Monitor will have powers under the Competition Act to "prevent anti-competitive behaviour in the provision of health care services for the purposes of the NHS which is against the interests of people who use such services" (Health and Social Care Bill [re-committed] 2011, p.36).

In addition, the *NHS Operating Framework 2011/12* indicates that, while the PbR tariff will remain the basis of the payment mechanism for hospital care (so that the market will operate largely on the basis of fixed prices), providers will have the opportunity to offer services to commissioners at less than the published tariff where commissioners and providers agree. This may move the basis of competition from quality to price (Department of Health 2011), despite empirical evidence showing that price competition is associated with reductions in clinical quality (Gaynor *et al* 2010; Cooper *et al* 2010; Le Grand 2009).

1.4 Rationale for the research

The importance of elevating the priority afforded to capital in health systems research has already been alluded to above. In addition, there are a number of important drivers for undertaking empirical research on the efficiency of private financing in this specific form.

As noted above, the UK has by far the largest and most advanced PFI programme in the world. However, private finance plays an increasingly important role in health investment globally. Within Europe, PFI programmes are in development in France, Germany, Italy, Portugal, Spain and Greece (EPEC 2010). According to a leading international law firm, the investment value of health sector PFI projects completed or in procurement in the European Union was more than €74 billion by the end of 2007 (DLA Piper 2008). Outside of Europe, countries including Canada, Australia, Brazil, Mexico and South Africa also have substantial privately financed health sector programmes (PricewaterhouseCoopers 2008). The use of private finance is also promoted by supranational institutions such as the European Investment Bank, the European Bank of Reconstruction and Development, the World Bank and IFC, the International Monetary Fund and the UN Development Programme (Hall 2008).

The scale of private finance in health care has given rise to an extensive critical literature. The empirical evidence described and evaluated in Chapter 5 of this thesis shows that the cost and quality of the operational components of PFI in the NHS are broadly similar to those provided conventionally procured hospital buildings. Specifically, it appears that the outturn costs of construction and service provision are similar to the equivalent costs in other hospitals while the cost of maintenance is higher. In terms of quality, the evidence suggests that the construction and operational components of PFI are delivered to approximately the same standard as those in conventionally procured facilities (though evidence is not available in the case of maintenance). There is, in other words, no evidence on which to conclude that there are cost savings or quality improvements in the operational components of the PFI structure that are sufficient to offset the higher cost of private finance (Treasury Select Committee 2011). If this is the case, it is important that the return to private investors does not exceed the level sufficient to remunerate investors for the risks they bear. Any element of return above this fair level represents a reduction in the cost efficiency of investments, and a reduction in the financial sustainability of the NHS.[12]

Perhaps for this reason, describing the returns to investors involved in PFI projects has been an important focus of both academic research and official audit (e.g. Cuthbert and Cuthbert 2008; Shaoul *et al* 2008; Hellowell and Vecchi 2009; Hellowell and Vecchi 2012; National Audit Office 2005a; 2006a; 2010b). In addition, the importance of evaluating the returns by relating these to the magnitude of risks borne by investors has been acknowledged. For example, the House of Commons Public Accounts Committee (2003, 2011) has identified this relationship as a priority topic for parliamentary audit and research. Such an evaluation has, however, not been forthcoming. An evaluation of investor returns requires the collection of data and documents that have been difficult to access hitherto (in part because of commercial confidentiality clauses in PFI contracts); and an approach to research that incorporates concepts and methods from a wide range of disciplines, including health policy, financial economics, corporate finance and bank financial management. These constraints and challenges have limited the opportunities for addressing this question comprehensively.

The government's case for using private finance rests on the claim that private sector investors are able to generate only a *normal*, as distinct from an *excess* return, on their investments.[13] In making this claim, a high degree of competitiveness in the market for

[12] The financial sustainability of a health system may be viewed as the value produced by that health system in excess of its opportunity cost, either to society (if the focus is economic sustainability) or the government sponsor (if the focus is fiscal sustainability) (Thomson 2008). By definition, any policy that introduces an element of cost inefficiency into the health system increases the opportunity cost of health care expenditure.

[13] These terms are briefly defined later in this chapter and in more formal terms in Chapter 4 of this thesis.

capital is assumed. For example, the UK Treasury (2003b) has suggested that the extent of competition in the primary market will be such that the return generated on a PFI project will contain no premium other than that required to compensate investors for bearing risk:

> "A great part of the difference between the cost of public and private finance is caused by a different approach to evaluating risk…The private sector takes account of risk by discounting future cash flow at a higher rate. A risk premium is therefore made explicit in the private sector cost of capital, and the level of return on capital is competitively determined according to the risks assessed in the project" (p.41-42).

However, it is evident that this view may mislead for several reasons, and is actually inaccurate if markets are uncompetitive. In that case, the cost of capital for an investment may reflect not just risk but the ability of an investor to use its market power to extract an additional profit. There are reasons why we might *a priori* predict a limited degree of competition in this market. Firms capable of winning PFI bids require strong balance sheets to persuade authorities that they are capable of bearing and managing the risks associated with asset construction, long-term maintenance and services, and this may lead to a concentrated market dominated by a small number of firms (Carillo 2006). In this context, the scale of the PFI programme undertaken by the UK government since 1993 may have placed significant constraints on the ability of the PFI industry to generate efficient capacity.

In oral evidence to the House of Commons Public Accounts Committee on 24 November 2010, Peter Coates, the Commercial Director of the Department of Health, stated as follows:

> "When you announce a major procurement process, as the NHS did, the market overheats, and I think controlling the market was quite difficult for [the Department], particularly as [NHS] trusts were very

interested in controlling their own destiny. I think that was a difficult time and perhaps some of the prices we paid reflected the market conditions at the time" (Public Accounts Committee 2010, p.19).

In addition, by virtue of their multi-dimensional and long-term nature, PFIs are complex procurements, so that a procurer's requirements cannot be specified in a simple way. This may lead to high transaction costs associated with searching for and negotiating with bidders, thereby generating high barriers to entry and limited competitiveness (*econ* 2004). Indeed, a priori, it seems reasonable to predict that the PFI procurement process may fail to generate efficient competition because of the cost associated with bidding for and negotiating contracts. Dudkin and Välilä (2005) provide a theoretical account of why PFI projects might have higher transaction costs than other forms of procurement, due to:

> "their long-term character, ownership and financing structures, and risk-sharing features. Due to all these reasons, the degree of contractual incompleteness is high in the case of [PFIs], and attempts to reduce that contractual incompleteness give rise to correspondingly high transaction costs. Consequently, the tendering and negotiating processes become more resource-consuming than in traditional short-term contracting aimed to supply assets, rather than services, to the public sector. Negotiating the contract is especially costly, not least due to the high cost of advisory services" (p.4).

If, in contrast to the Treasury's claims, the market for PFI investments is concentrated or otherwise uncompetitive and the government does not intervene to regulate the price, the return to investors will be above the normal rate (see Chapter 4 of this thesis for a full discussion). This, in turn, has significant implications for the cost efficiency of the PFI method and the attractiveness as a form of capital financing for health care infrastructure.

In some cases – e.g. where the budgetary impact of a PFI project is very significant – excess returns may reduce the capacity of health systems to meet health care needs within the populations they serve.[14] Research shows that PFI assets are often specified on the basis of planning projections (relating to, for example, demand growth, length of stay and bed-occupancy) that vary from levels implied by trends across the rest of the NHS (Gaffney *et al* 1999; Price and Green 2000; Sussex 2001). There is also evidence that NHS organisations with operational PFI hospitals have higher capital costs than those operating in non-PFI facilities, and that efforts to offset this through reducing unit costs (relating to, for example, in-patient beds and non-clinical staff) often reduce service capacity and harm the quality of care (National Audit Office 2007a; Hellowell and Pollock 2009; Hellowell and Pollock 2010).

The evidence is consistent with the conclusion that the capacity of the NHS is being restricted so as to enable organisations with new PFI projects to meet the associated revenue costs (Sussex 2001). In addition, it is evident that the deficits and legacy debts of many financially challenged NHS organisations are in part caused by underfunding of PFI costs under the Payment by Results regime described above (Palmer 2011) – a fact that has recently been acknowledged by the Secretary of State for Health, Andrew Lansley (Winnett 2011). As the PbR tariff includes a payment for costs designed to equal the average cost of capital charges in the NHS,[15] Trusts with higher than average capital costs will under this

[14] The concept of need in health economics is contested (e.g. Williams 1978; Culyer 1998; Robertson 1998). However, the technical production relationship between health care and health implies that an individual needs a given health care service when that service has been shown to be effective for that person's specific health problem, and for which there are few available substitutes (Hurley 2001). In this thesis, where the health system's capacity to meet health care need is discussed, this is the concept of need that is referred to.

[15] Across the UK, an NHS organisation's total costs are made up of revenue costs (such as those associated with staff, medicines and other supplies) and capital costs. For an NHS organisation without an operational PFI hospital, capital costs are the sum of depreciation of fixed assets (an accounting charge to reflect the extent to which the value of the asset has reduced during the year) and the *dividend on public dividend capital (PDC).* The PDC is a payment made by the NHS organisation to the Treasury, which reflects the opportunity cost of

system receive a lower level of funding than is required to meet their capital costs. Consequently, NHS or Foundation Trusts with operational PFI contracts are, in effect, under-funded for their fixed capital costs, and run a relatively high risk of recording a deficit on their income and expenditure accounts (Palmer 2006; Hellowell and Pollock 2009; Mason *et al* 2009; Hellowell 2011b). As NHS and Foundation Trusts have a statutory duty to break-even, this may force them to constrain the capacity of services, curtail the use resources in completing treatments to a greater extent than other Trusts, and potentially undermine the quality of patient care. This highlights the challenge of meeting the costs of PFI projects in a market-based delivery system, in which risk pooling between NHS organisations is limited.

As a recent King's Fund report points out, a competitive market may, for those Trusts that are systematically disadvantaged due to their higher capital costs, "inadvertently cause deterioration in the quality of essential services they provide" (Palmer 2011, p. 20). Should patients respond to quality-shading measures by choosing to be treated by other providers, this will "further increase the risk of a downward spiral of declining income, increasing deficits and deterioration in the quality of care and the safety of essential services" (p.25). Therefore, in a context in which the NHS, in England at least, faces the prospect of significant competition-oriented reform, it is additionally important that financing for new capital projects comes from the most efficient source and that, where private finance is utilised by NHS organisations, equity and debt investors earn only a normal rate of return.

not investing the funds elsewhere in the economy (Sussex and Sosa-Rubi 2005). When an NHS organisation has a PFI project in operation, the finance lease element of the unitary charge substitutes for the capital charge.

Despite ministerial concerns about the financial sustainability of NHS Trusts with large operational PFI contracts (as detailed above), the current government has expanded the use of this financing mechanism in the health system (Hellowell 2011b). At the time of writing (November 2011), the role of private finance as the dominant source of capital for large-scale investments in the UK public sector as a whole appears secure, despite the change in government - from Labour to a Conservative-Liberal Democrat coalition - in May 2010 and despite the decision of the Chancellor of the Exchequer to engage in a review of the PFI, aimed at seeking ways of accessing a wider range of financing sources, and thereby reducing the model's reliance - since the financial crisis - on the commercial banks for debt capital.[16]

The coalition's second Budget, published in March 2011, provided details of six new PFI schemes being procured, representing £984 million of private investment being bid in the NHS in England (HM Treasury 2011b). Several other authorities – such as a £450 million plan to rebuild the Hartlepool Hospital – have also submitted business cases for PFI projects to the Secretary of State (Hellowell 2011b). In addition, the Scottish government is pursuing a PFI of £250 million to re-provide the Sick Kids hospital in Edinburgh, along with a number of smaller schemes with a combined *capital value*[17] of some £300 million (Scottish Futures Trust 2011). As the return to investors will be a major part of the cost of these new projects it is important, in terms of the efficiency by which capital is utilised and the impact that these projects have on the budgets of the NHS Trusts involved, that the cost is minimised.

[16] Ministers have said they wish to encourage a stronger role for pension fund investors in PFI, which, as discussed in more detail in Chapter 9, exited the PFI market during the financial crisis of 2007-09 (Chancellor of the Exchequer 2011). The desire to access a wider range of financial sources reflects changes in bank regulations and concerns about the quality of assets held by UK and eurozone banks, both of which have led to restrictions in long-term lending and an increase in the rates of return demanded (Hellowell 2010).

[17] The Department of Health defines the term 'capital value' as the "costs of land, construction, equipment and professional fees but excluding VAT, rolled up interest and financing costs such as bank arrangement fees, bank due diligence fees, banks' lawyers' fees and third party equity costs" (Department of Health 2009).

However, given the scale of investment in the NHS over the last 15 years, it seems likely that the bulk of future PFI growth will occur overseas - in high-income countries such as Italy, Spain and Canada (where sizeable PFI programmes are established), middle-income countries such as China, Brazil, and Mexico (where PFI schemes are in development), and low-income countries such as India, Bangladesh and Botswana (where PFI is being considered). In low income settings, PFI programmes are being promoted by the World Bank as "a novel way to simultaneously improve health infrastructure and health care services, while creating a platform for addressing other system-wide inefficiencies" (The Global Health Group 2009, p.5). The World Bank's financing arm, the International Finance Corporation (IFC), is also actively involved in both promoting and co-financing PFI projects in middle- and low-income countries. In a recent issue of *Handshake,* the IFC's quarterly journal on privately financed projects, the corporation's director Laurance Carter writes:

> "Governments' ability to provide affordable, quality healthcare dwindles every year. The challenge is now to engage private partners to deliver public benefits. Innovative, forward-looking public-private partnerships in healthcare do this, giving businesses an unparalleled opportunity to do well while doing good" (IFC 2011, p.1).

Given the rise of the World Bank-IFC as an influential actor in setting the agenda for global health policy, particularly in its desire to involve the private sector in health finance and delivery (Buse and Harmer 2007), this advocacy may be decisive. As the use of PFI in health care becomes an increasingly global phenomenon, for which the programme undertaken within the NHS is both an inspiration and a model, it is important that the experience of NHS PFI is well-understood. Its cost efficiency is therefore an important focus for research.

The British government has also looked to "export" the PFI model to developing countries. According to Holden (2008), this became an important part of the Labour government's industrial strategy during the last decade, with a focus on winning contracts in emerging markets for UK-based financial institutions, consultancies and construction firms. The strategy was led by DH International (DHI), a unit of the UK Department of Health, which liaised with other departments and industry interests to identify priority export markets. The adoption of PFI in other countries is seen to be of strategic importance to UK firms, as these are the "market leaders in PFI due to its extensive use in the NHS" (Holden, p. 314).

In summary, while there has been a good deal of research focused on describing the return to investors on PFI projects, evaluation of those returns has proved difficult owing to the absence of data. Yet assessing the fairness of returns is an important element of understanding the cost efficiency performance of this form of capital financing. Similarly, there are *a priori* reasons to question the degree to which the markets for primary investments in PFI projects will be competitive and therefore ensure that returns converge around the fair and efficient level, and an absence of empirical work on this issue. Given that PFI has led to budgetary difficulties among some NHS organisations, and threatens to create yet more challenges as the degree of risk pooling between NHS organisations is curtailed further, it is important to understand the origin of such problems. Finally, as PFI is being expanded both in the UK and internationally (supported by both the British government and a number of influential supranational institutions), the importance of research which aims to determine the cost efficiency of this model of financing is clear.

1.5 Structure of the thesis

This document is arranged in nine chapters, including this introductory chapter. The remaining eight chapters are organised as follows:

Chapter 2 provides an analysis of the PFI model's development, scale and operation in the NHS. The revenue impact of PFI projects and the growing scale of the financial burden are outlined. The methods by which PFI assets, expenditures and liabilities are recorded in public sector financial reporting are explained, showing how a "fiscal incentive" exists for the government to pursue private finance. An account of PFI's historical development shows the institutional, legal and personnel changes that have taken place to drive its expansion.

Chapter 3 examines how PFI projects are procured and appraised by public sector organisations, how the private sector counterparty in a PFI project is owned and financed and how the revenue generated by the private sector is allocated to the firms involved. The identified features of ownership and cash flow distribution are used to provide an analysis of the allocation of risks to (a) the private sector counterparty, and (b) the firms within the private sector counterparty. In doing so, the chapter provides the data and analysis required for interpreting the main empirical findings of this study, presented in chapters 7 and 8.

Chapter 4 describes the central theoretical framework that underpins and integrates the two substantive empirical components of this thesis. Specifically, it outlines the theoretical rationale for combining the two components of the study, and reviews the theoretical literature used in developing the analytical approaches employed. The concepts "return", "fair return" and "excess return" are examined from the perspective of financial theory.

Chapter 5 reviews the empirical literature on PFI's economic performance and in particular whether the model has minimised the financial resources used in delivering capital goods and services. For PFI to represent a cost efficient mechanism, it must provide savings and/ or quality improvements in terms of better risk allocation, greater cost certainty, a focus on whole-life costing and longer-term performance management sufficient to offset the higher return on private finance. Whether PFI has been shown to achieve this is evaluated here.

Chapter 6 outlines data collection methods and provides a detailed account of the methods employed to measure: (i) the returns projected by investors, (ii) the degree of market concentration, (iii) market dynamics and (iv) competitiveness in the procurement process.

Chapter 7 identifies the returns that are projected to be earned by private investors on 11 PFI projects commissioned by NHS organisations in England and Scotland and evaluates these through the application of capital budgeting techniques. The chapter outlines an analytical framework, grounded in corporate finance theory, for measuring and evaluating returns. Cost of capital benchmarks are used as comparators to (1) evaluate the Internal Rate of Return for each project, and (2) as discount rates to calculate Benefit-Cost Ratios.

Chapter 8 examines the *structure* and *competitiveness* of the market for private finance in delivering new hospital infrastructure in order to explore the sources of excess returns identified in the previous chapter. The chapter initially examines the extent of concentration and the entry/exit rates in the project finance markets for new NHS hospitals. In addition, as market share is allocated to firms through a tendering process, features of procurement such as the scale of transaction costs, the number of bidders and the extent of monopoly bargaining, are used to assess the extent to which returns are competitively determined.

Chapter 9 identifies the key findings of the thesis as: (i) that the returns to investors on a group of PFI schemes are in excess of the fair rate; and (ii) that the institutions through which returns are determined have failed to mitigate the potential for market power to be exercised. In turn, the main implications are identified as: (a) that NHS organisations are paying unnecessarily higher unitary charges for their projects; and (b) that the opportunities for additional capital investment have been curtailed. International implications are considered, the case for regulation is discussed and priorities for future research identified.

2. The use of PFI in the NHS

2.1 Introduction

This chapter provides an analysis of the PFI model's development, scale and operation in the NHS. It is shown that the PFI is a major call on health system revenue and that the financial burden will increase over the next few years as new contracts are signed for projects currently in procurement. The methods by which PFI assets, expenditures and liabilities are recorded in public sector financial reporting are explained, showing how a "fiscal incentive" exists for the government to pursue private finance. It is argued that this incentive has been influential in driving the use of PFI, and may have become more so in recent years in the context of rapidly diminishing public sector capital investment and the political priority afforded to eliminating the fiscal deficit. An account of the model's historical development demonstrates the ideological, political and financial role of the policy for successive governments, and the institutional, legal and personnel changes that have taken place to enable its implementation and expansion. The influx of private sector professionals into the bureaux tasked with formulating PFI policy and managing the programme is illustrated.

The last element here is of core significance for this thesis. It is acknowledged that, as industrial organisation scholar and former US anti-trust regulator William G. Shepherd has noted, "policies influence markets; but also, powerful companies in those markets tend to influence the policies" (Shepherd 2005, p. 104). In considering the core empirical elements of this thesis, in terms of the structure and competitiveness of the market and the rates of return that market players are able to secure, the extent of private sector influence and power in the formulation and implementation of PFI policy is great importance. As Hodge has noted (2010), private sector involvement in policy-making does not necessarily imply a conflict of interest or corruption, but it does demand “the need to think more carefully about the size of financial rewards, the existence and power of personal and corporate incentives, and the need to be vigilant about the price paid...for PFI contract deals” (p. 3).

2.2 The financial reporting of PFI transactions

The way in which the assets and liabilities accruing to PFI projects are reported in the financial accounts of the different stakeholders has had an important impact on the policy. From the perspective of the public sector, a key advantage of PFI has been its “off balance sheet” status. This has provided short-term benefits for individual central government departments (including the devolved administrations) and the Treasury. For departments, PFI has enabled more capital investment to take place than their allocated capital budgets would have allowed. For the Treasury, it has allowed projects to proceed without the related investment scoring immediately on the main indicator of the government’s fiscal position – namely, Public Sector Net Debt (PSND) (Office for Budget Responsibility 2011a).

Thus, the PFI has enabled additional investment and the appearance of lower government borrowing, providing a strong (and perverse) “fiscal incentive” for the government to promote PFI, regardless of whether it is the most efficient form of financing (Gosling 2003). Recent reforms to the accounting framework used by the UK public sector have created a degree of confusion about the extent to which the “fiscal incentive” remains in place. To understand the current situation, it is useful to consider three different levels of financial reporting for PFI, and the impact that each one has on the incentives faced by government.

(i). The accounting treatment. Each PFI is classified as a public or private asset in the financial accounts of the public authority involved. Prior to April 2009, this process was governed under UK (GAAP) accounting standards which, allowed public sector accountants and auditors to assess whether the assets created through a PFI belonged “in substance” to the public sector or the private sector (EPEC 2010). The assessment was based on a “risk and reward” criterion. The interpretation of this typically applied by auditors was that, since “most project risk” had been transferred to the private sector, the assets involved should not be reported on the public sector balance sheet (EPEC 2010). Under this system, 99% of NHS PFI assets by capital value were recorded off balance sheet by auditors (Heald 2008).

However, since April 2009, the UK public sector has moved from domestic to international (IFRS) accounting standards. This operates according to a different theoretical framework to that of GAAP, in which the central criterion for balance sheet allocation is who “controls” the asset, rather than the entity that carries the “risks and rewards” (EPEC 2010). This criterion considers two features in particular: the control or regulation of the services the private sector partner must provide; and the control over the residual value of the assets should the contract be terminated. In other words, if a government retains ultimate responsibility for an asset, then it “controls” the asset and should record it on its balance sheet. As a result of the shift from “risk and rewards” to “control”, most PFI assets are now recorded on the balance sheets of the public authorities involved (HM Treasury 2011a).

(ii). The statistical treatment. The above does not imply, however, that investment secured under PFI contracts now regularly shows up in PSND. This is because the national borrowing statistics are reported under the European System of Accounts (ESA) framework, which

continues to operate on a “risk and rewards” criteria (Heald 2008). So long as certain risks are deemed to be passed to the private sector on a project (i.e. the risks associated with constructing the asset and keeping it open and available for use), then the project is recorded off balance sheet by the public sector – i.e. invisible to the calculation of PSND.

As is demonstrated later in this chapter, most construction risk is transferred (e.g. the private sector bears the risk of late delivery, failure to meet contracted standards or events that require compensation to third parties); as is availability risk (e.g. the risk that services are not delivered to the specific quality). Consequently, most PFI assets are accounted for as private sector assets under ESA, and therefore off-balance sheet for the purposes of compiling public debt statistics (EPEC 2010). According to correspondence between Robert Chote, Chairman of the Office for Budget Responsibility, and Andrew Tyrie, Chairman of the Treasury Select Committee, which was shared with the author in October 2011, including the NPV of the current PFI liabilities accrued in England (i.e. not the devolved administrations) would add £33 billion to the PSND (Office for Budget Responsibility 2011b).

(iii). The budgeting procedures. Just as the capital values of most PFIs are invisible to the national debt statistics, they also often remain *additional* to both government and departmental capital budgets (Office for Budget Responsibility 2011a). As with calculation of the national debt, the level of capital expenditure continues to be measured according to the ESA, and in most cases this will result in off balance sheet status. There is, therefore, a fundamental difference between the current budgeting procedures and accounting procedures. This difference has a major impact on the recognition and budget control of financial commitments originating from PFIs relative to conventionally procured capital

projects (EPEC 2010). For conventionally procured projects, the full capital cost of a project is reported in the budget upfront. Off-balance sheet PFIs do not require such reporting – rather, the annual unitary charges are recorded against the budget as they are incurred.

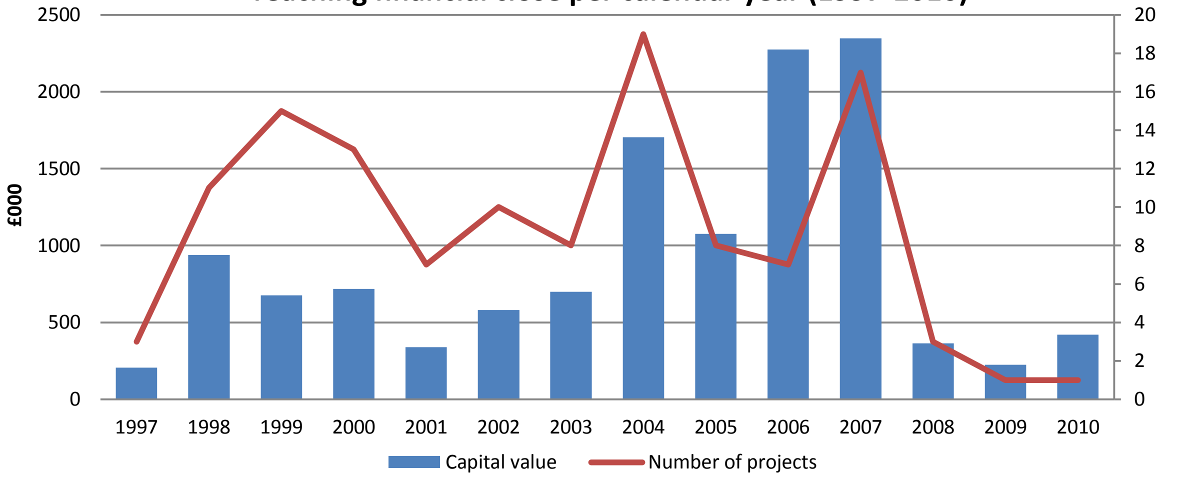
Consequently, the vast bulk of capital investment secured through the PFI is not recorded in departmental budgets or PSND (Office for Budget Responsibility 2011a). As long as projects can be structured to ensure off-balance sheet treatment under ESA, the incentive to promote PFI over other forms of procurement is preserved at central government level. Because the UK government budgets separately for capital and revenue costs, differences in the budget treatment of PFIs and conventionally procured projects have an impact on both the allocation of budgetary resources and the management of the public finances. An off-balance sheet PFI results in a shift in commitments from a capital budget today to an operating budget over the years to come. This "frees up" space in the current capital budget and thus enables a larger amount of on-balance sheet capital investment to be undertaken. However, it also generates a long-term financial burden for the public authorities involved.

2.3 The scale and significance of the PFI programme

Between 1993 and 2011, the PFI was among the most important methods of large-scale capital expenditure used by the UK government. Privately financed projects were commissioned by every department of central government and many local authorities. They relate to various areas of public service, with healthcare, transport, defence, education and waste management among the principal sectors. As of April 2011, contracts for 698 PFI projects had been signed between public authorities and private consortia in the UK, representing capital expenditure of £62 billion in 2010 prices, and generating a total long-term public sector liability estimated at £290 billion in 2010 prices (HM Treasury 2011a).

In the NHS, 123 PFI contracts for new hospitals had been signed as of April 2011, with a combined capital value of £15.9 billion in 2010 prices[18] and a projected long-term nominal cost to the taxpayer of £72 billion (see Figures 2.1 and 2.2 overleaf) (HM Treasury 2011a). The annual payments relating to these schemes are due to peak at £2.5 billion in nominal terms in 2028/29. More than 97% of the capital expenditure relates to hospital projects in England and Scotland, where major NHS hospital-building programmes have been underway. In England, the PFI provided the dominant form of procurement in the delivery of the Labour government's hospital re-building and rationalisation programme. Private finance accounted for more than 91% of the capital invested in the programme (Hellowell and Pollock 2010). In Scotland, contracts for 17 PFI hospitals have been signed, including all six of the large district general hospital contracts signed since 1997 (HM Treasury 2011a).

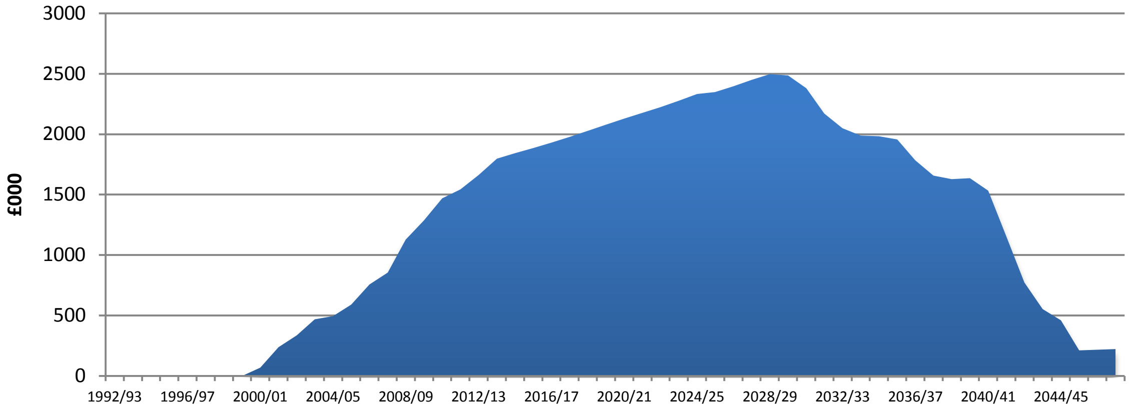
Figure 2.1 Number / capital value of PFI contracts for hospital projects reaching financial close per calendar year (1997-2010)



Sources: HM Treasury (2011a)

[18] These figures exclude some smaller PFI contracts, and also some larger schemes relating to non-hospital infrastructure, mostly IS/IT projects, the market for which is not within the scope of analysis in this thesis.

Figure 2.2 **Actual and projected unitary charges for fiscal years 1996/97 - 2047/48 for all NHS PFI projects signed in the UK as of March 2011**



Source: HM Treasury (2011a)

2.4 Private finance in the NHS: history and prospects

The PFI was introduced by John Major's Conservative government in the Autumn financial statement of November 1992. The announcement, by the then Chancellor of the Exchequer Norman Lamont, began a five-year process of legal and bureaucratic changes aimed at facilitating the routine use of private finance by public authorities. A review of statements from Conservative ministers over the early to mid-1990s reveals a variety of declared aims for the PFI, and a number of financial, political and ideological influences. The aims included: reducing the size and scope of government (Chancellor of the Exchequer 1993); reducing political interference in investment decisions (Chancellor of the Exchequer 1993); reducing the size of the government's debt (Dorrell 1993); providing the population with better public facilities and services (Chancellor of the Exchequer 1996); and improving the cost efficiency by which public capital projects are delivered (Chancellor of the Exchequer 1996).

Ideologically, the introduction of private finance was congruent with the Conservative party's 'New Right' agenda, providing a means of growing the private sector's role in parts of the public sector where outright privatisation was considered unachievable (Greenaway *et al* 2004). As discussed above, financially, the PFI has the advantage of allowing capital spending to bypass the 'headline' estimate of government debt – under the Conservatives, the Public Sector Borrowing Requirement (PSBR) and subsequently, under Labour, PSND. This was a politically important matter to the Conservative government, which wanted to invest in new capital while retaining a reputation for prudent fiscal management (Heald 1997). In the early 1990s, public sector net investment as a proportion of Gross Domestic Product had fallen to historically low levels - from 7% in 1970 to less than 1.6% in 1992 (Clark *et al* 2001). In its 1996 Budget statement, the Conservative government projected a further fall, to 0.75% in 2000/01 (Chancellor of the Exchequer *et al* 1996). In effect, the PFI was designed as a substitute for public capital spending, releasing more money in the short term for recurrent expenditure and lowering the official measures of government debt.[19]

After some initial hostility while in opposition, the Labour Party embraced the concept of private finance in 1994, under the leadership of John Smith. In that year, three senior Labour spokesmen - Gordon Brown (later Chancellor of the Exchequer and Prime Minister), John Prescott (later Deputy Prime Minister) and Robin Cook (later Foreign Secretary) - published a policy review document, *Financing infrastructure investment: promoting a*

[19] In addition, early plans to extend private finance from so-called 'economic infrastructure' (e.g. roads and railways) to the politically more sensitive sectors of 'social infrastructure' (e.g. health care, education and council housing), drew strongly on the ideas of David Willetts MP, as outlined in a pamphlet for the Social Market Foundation on ways of bringing private funds into the NHS (Willetts 1993). The pamphlet had been funded by health insurer and provider BUPA and written while Willetts was acting as a consultant to Healthcall, a private health firm (Ruane 2010). Willetts went on to act as adviser to Dresdner Kleinwort merchant bank, a major beneficiary of PFI, and is currently the universities minister in the coalition government.

partnership between public and private finance, which outlined the Labour Party's approach to the PFI. The paper outlined a Keynesian rationale for the use of private finance, which, it was suggested, could support the creation of new jobs while enhancing economic growth.

The Conservatives had been relatively candid about using PFI as a substitute for public expenditure, but the Labour document had a clearer focus on the ability of private finance to provide *additional*, as opposed to *substitutional,* capital investment by virtue of its ability to conceal borrowing from measures of the UK's national debt. The paper argued that the Conservative government's decision to use private finance for public service projects only where it could deliver savings over conventional procurement was no more than "an excuse for refusal", since public finance could always be provided at a lower cost (p.14). It proposed that the comparison should instead be the cost of private finance against the overall *welfare cost* (in terms of social, environmental and economic losses) of not undertaking the project.

The publication of *Financing infrastructure investment* was regarded as an important political shift by many political commentators at the time. Gordon Brown stated in briefings to the media that the document was an attempt to "steal a march on the Conservatives" by endorsing a major expansion of one of the government's flagship pro-business policies (*The Observer* 1994). More importantly, however, the document was widely regarded as a key component of Labour's attempt to develop a new relationship with the private sector, and in particular the financial institutions of the City of London and their advisers - interests within British industry that had in the past been hostile to the Labour Party. Shortly after the report's launch, Labour leader John Smith joined key banking figures and the Conservative Treasury's head of private finance policy, Alistair Morton, for a conference on PFI at

Mansion House in the City. This intervention was described by *The Times* newspaper as "proving the [Labour] party's allegiance to British industry and commerce" (Leathley 1994).

In his 1995 budget the Conservative chancellor Kenneth Clarke announced a re-launch of the PFI with a £9.4 billion list of "priority" projects. In quantitative terms, this period was the key breaking point in the development of the PFI programme. Between April 1990 and April 1995, three PFI contracts were signed, all of them toll roads. Between April 1995 and Labour's election in May 1997, 24 further contracts were signed, with a combined capital value of £1.25 billion. By the time Labour took power, the implementation of the PFI had gathered momentum, having been under way for five years. Large PFI schemes for hospitals in Dartford and Gravesham and Norwich and Norwich had been brought to an advanced stage, though no NHS contracts were signed until after the election (HM Treasury 2011a).

Labour's 1997 general election manifesto contained a promise to "reinvigorate the Private Finance Initiative" with a specific commitment to advance the use of PFI in the NHS (The Labour Party 1997). The first piece of legislation passed by the new Labour government was the NHS (Private Finance) Act, which formally provided NHS Trusts with the power to enter into long-term binding contracts, thereby providing assurance to financial institutions that investments in PFI hospitals would be underwritten by central government in the case of an NHS Trust becoming insolvent (Greenaway *et al* 2004). In the first two years of the Labour administration, the NHS became one of the most important of the PFI sectors in the UK. As Figure 2.1 (above) shows, 14 PFI contracts for hospitals were signed by NHS organisations in 1997 and 1998, representing combined capital investment of £1.14 billion (in 2010 prices).

It has been argued that for the Labour government the “fiscal incentive” to use PFI had greater salience than for its Conservative predecessor (IPPR 2001). The Labour Treasury had a strong incentive to minimise aggregate debt, having introduced a ‘sustainable investment rule’, stipulating that the aggregate stock of government debt should not exceed 40% of Gross Domestic Product. The sustainable investment rule was introduced in 1998 by the then Chancellor of the Exchequer Gordon Brown, and was - in combination with the ‘Golden Rule’, which constrained the degree to which borrowing could be undertaken for servicing revenue expenditure - a key component of a new “fiscal framework”, designed to underline the Labour government’s competence and control over the public finances (Gosling 2003).

Labour’s commitment to the PFI helped to consolidate its links with the City of London (Ruane 2010). Under the Conservatives, there had been a significant injection of private sector personnel into central government specifically to deal with the implementational challenges of PFI. Under Labour, this process was significantly expanded. In 1997, a PFI Treasury Task Force was established with a *policy arm* staffed mostly by civil servants[20] (focused on the drafting of guidance) and a *projects arm* staffed by private sector professionals (focused on providing practical support and expertise to public authorities involved in contracting). The latter component of the taskforce was in 1999 re-constituted as a limited company, Partnerships UK (PUK). In the following year, 51% of PUK was sold to 10 PFI investors for a total of £45 million (Hellowell 2010). Thus, the main project support agency of central government was itself a joint venture whose majority owners were financiers and other industry players (see the list of most recent owners in Box 2.1 overleaf).

---

[20] This was the successor to a Treasury body, the Private Finance Panel, established under the Conservatives. The PFP published a number of documents offering guidance to public authorities on particular aspects of the PFI and its implementation (see, for example, Treasury Private Finance Panel 1996a, 1996b, 1996c and 1997).

In addition, PUK's employees, including its chief executive James Stewart, a former head of project finance at equity group Newport Capital, were drawn from financial institutions and professional advisory firms. While in theory PUK's role was in *implementation*, as opposed to *policy*, in practice, the lines between these elements became blurred over time (Hellowell 2010). PUK derived most of its income from fees, paid by public authorities and the Treasury for its role in the planning and procurement of projects. However, the firm also authored the government-wide *Standardised PFI Contracts,* thereby determining the contractual terms on which projects were based. It also managed taskforces on refinancing and post-contractual issues, and provided staff on secondment to assist in setting up new initiatives and agencies – prominent examples being NHS LIFT and Building Schools for the Future.[21]

Partnerships UK became, in other words, an extremely important part of the policy-making bureaucracy in Whitehall (Hellowell 2010), despite the fact that it was formally a private sector company. In addition, the Treasury's private finance unit, which held 44% of PUK shares (5% were held by the Scottish Government) was also staffed by private sector professionals, and was directed by a succession of individuals on secondment from major investors and practitioners in the PFI industry, such as Geoffrey Spence from Deutsche Bank (latterly head of global infrastructure at HSBC), and two senior managers from PricewaterhouseCoopers, Richard Abadie and the most recent incumbent, Charles Lloyd.

[21] As discussed below, James Stewart himself initially became chief executive of Infrastructure UK, a body established under Labour in 2009 to draft and implement a government infrastructure strategy, in addition to leading the government's work on generating new sources of finance for infrastructure. A substantial proportion of senior PUK staff also moved to Infrastructure UK to manage and run infrastructure policy.

Box 2.1 Private sector shareholders/ shareholdings of Partnerships UK (June 2010)

- The Bank of Scotland (8.8%)
- The Prudential Assurance Company (8.8%)
- Santander (6.7%)
- Sun Life Assurance Society (6.7%)
- The British Land Company (2.2%)
- Barclays (6.1%)
- Royal Bank of Scotland (6.1%)
- Serco (3.3%)
- Global Solutions Limited (2.2%)

(Total: 51%)

Indeed, a major feature of policy-making in this area has been the increasing influence of accountancy firms such as PricewaterhouseCoopers. The accountancy industry is dominated by the "big four" firms (formerly the "big five" until the demise of Arthur Andersen in 2002 following its involvement in the Enron scandal): namely, PricewaterhouseCoopers, KPMG, Deloitte and Ernst & Young. The involvement of these firms has taken many forms, including: (1) providing advice on projects and policy; (2) seconding staff to government; (3) undertaking research to inform changes in technical areas of policy and writing reports which evaluate the programme; (4) advising public and private sector organisations involved in projects; (5) lobbying for the expansion of the policy internationally; and (6) sponsoring research on PFI (Shaoul *et al* 2007). While in opposition, Labour had developed strong links with Arthur Andersen and especially its consultancy arm Andersen Consulting. The future Chief Secretary to the Treasury, Geoffrey Robinson, had paid for Andersen's staff to develop Labour's economic and fiscal policies (Craig 2006). In government, Patricia Hewitt, who had been head of Andersen's research unit, became a Cabinet minister (and eventually Secretary of State for Health). In 1999, the firm was commissioned to research and write a report on the value for money of PFI, which concluded that PFI provided savings over conventional procurement of some 17%.[22] In this way, the policy-making process in PFI has been heavily

[22] See the literature review in Chapter 5 for a description and evaluation of the conclusions of this report.

influenced by what Hodge and Bowman (2006) have called the *consultocracy,* which they describe as the network of professional advisers who are able to use expertise and power to influence the policy of governments in accordance with their own firms' financial interests.

In a similar vein, Shaoul *et al* argued:

> "While big business has always been able to exert power and influence, the last 10 years have seen a huge intensification of this process in which PFI/PPP has played a major role. The increasing privatisation of policy formulation and implementation by those with very different interests to those of the public at large has in turn reinforced business's political and financial position, not just at the national but at the international level" (2007, p.492).

This process was heavily criticised by trade unions such as Unison, the GMB and the Public and Commercial Services Union, which are the largest public sector unions in the UK. Unison's general secretary described the relationship between the government and its advisers as "a web of deceit bordering on corruption" (*The Guardian*, 11 September 2002). In 2002, the Labour Party conference passed a resolution opposing PFI and calling for a moratorium on the policy until an independent review of the policy's value for money had been carried out. The government opposed this on the grounds that a review would bring existing procurements to a halt and damage confidence in the market (*The Telegraph* 2002).

In relation to PFI in health, the British Medical Association has also been a consistent opponent (Greenaway *et al* 2004). The expansion of PFI also had the effect of drawing criticism from a considerable section of the academic community. Academics such as Jean Shaoul of the University of Manchester (quoted above), and Allyson Pollock at University

College London (later the University of Edinburgh and Queen Mary's University), maintained a prolonged counter-argument regarding the costs of PFI and its detrimental effects on the service capacity of the public sector (see, for example, Pollock 2000; Pollock et al 2002; Gaffney *et al* 1999). However, Labour Party MPs on the House of Commons Select Committee voted to include fierce censure of Allyson Pollock in its report on private sector involvement in the NHS, on which Pollock had been acting as special adviser. The report described her criticism of the PFI as "so extreme" that the committee could have no confidence in her research or evidence to the inquiry (Health Select Committee 2002, p.31).

The influx of private sector individuals into the core of Labour's PFI policy-making nexus undoubtedly transformed the party's relations with certain parts of private industry. The Treasury in particular, under Chancellor of the Exchequer Gordon Brown, regarded the promotion of PFI across the UK public sector and internationally as a means of cementing relations with the City of London. In a speech to the Confederation of British Industry in May 2003, Brown stated that the government would use its influence to expand the use of PFI in the European Union, as part of a broader push to open up service markets on the continent (Brown 2003). Along with DH International (the export promotion efforts of which are described in Chapter 1), PUK provided support for PFI programmes developed by a number of overseas governments, including those of the Czech Republic, Mexico and South Africa (Partnerships UK 2010). The technical procedures, guidance and standardised contracts produced for public authorities in these countries are based substantially on those of the UK, which facilitates market entry by British banks and other firms (Allen & Overy 2010).

2.41 The PFI under the coalition government (May 2010-)

Recently, statements by ministers have given the impression that PFI will not be promoted by the coalition government. During the election campaign in mid-2010, the then shadow (and now current) Chancellor of the Exchequer George Osborne stated that "Labour's PFI model is flawed and must be replaced" (Kirkup 2009a, p.3). Even in government, Conservative ministers have been critical of the previous administration's record on PFI. The Cabinet Secretary Francis Maude has described some PFI deals as "ghastly" (Kirkup 2011).

However, government policy, as revealed in recently published documents and statistics, is more favourable to PFI than ministerial rhetoric would indicate. A "technical update" issued by the Treasury in July 2010 stated that the government "remains committed to Public Private Partnerships (PPP), including those delivered via the Private Finance Initiative (PFI), and such arrangements will continue to play an important part in delivering Britain's infrastructure" (HM Treasury 2010a). In addition, figures published by the Treasury after the 2011 Budget show that the PFI is projected to expand significantly in the coming years (HM Treasury 2011b). In total, 61 new PFI contracts were being procured as of March 2011, with health care, public transport, waste management and social housing among the largest sectors in terms of the number of new schemes and the value of the capital investment they are expected to deliver (see Figure 2.3, p.46). A total of 35 schemes with a combined capital value of £3.55 billion were projected by the Treasury to reach financial close in 2011.

In the health sector alone, six new PFI schemes are being procured, representing £984 million of planned capital investment in the NHS in England (HM Treasury 2011b). A number of less advanced schemes – such as a £450 million plan to rebuild the Hartlepool Hospital - are in the planning stage and may commence procurement in 2012 (Hellowell 2011b).[23]

In addition, the Scottish government is pursuing a £250 million PFI project to re-provide the "Sick Kids" hospital in Edinburgh, along with a number of smaller health schemes with a combined capital value of £300 million (Scottish Futures Trust 2011). Across the Scottish public sector, new private finance schemes with a combined capital value of £2.5 billion will be tendered over the next two years, according to the Scottish Government (2011).[24]

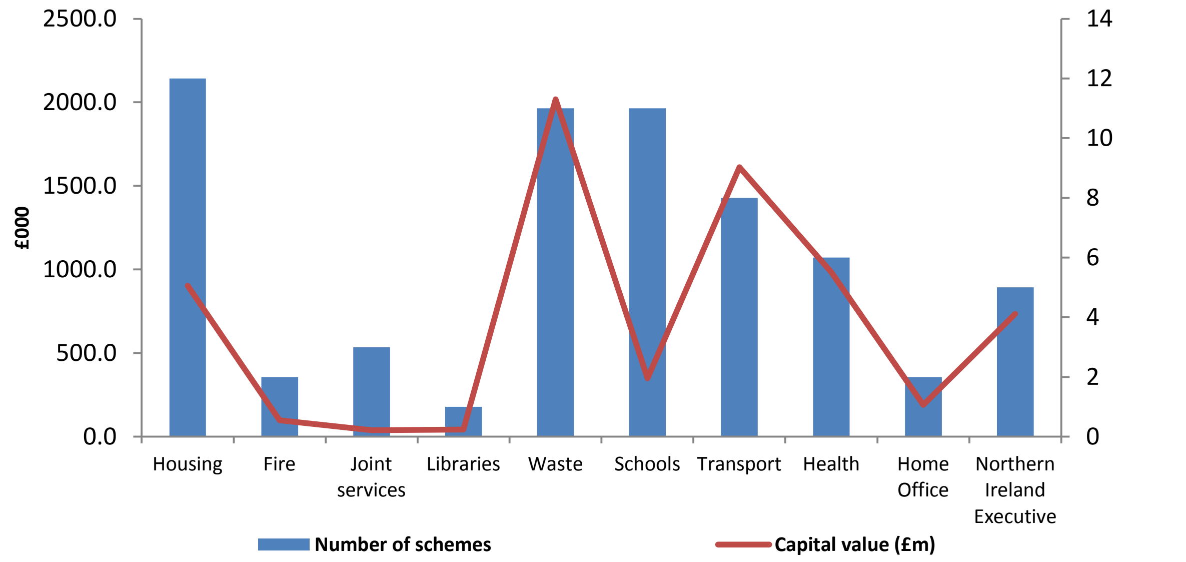
Future projects are likely to be influenced by the outcome of a government review of PFI, underway at the time of writing, which is aimed at finding ways of reducing the current reliance on commercial banks by accessing "a wider range of financing sources, including encouraging a stronger role to be played by pension fund investment" (HM Treasury 2011f, p.4). What the outcome of this review will be cannot be determined at the time of writing, though the Treasury has stated that it wishes to "maintain the incentive on the private sector to deliver capital projects to time and to budget and to take performance risk on the

[23] On 17th June 2010, the outline business case for a £320 million PFI hospital in Liverpool was approved by the coalition government (Royal Liverpool and Broadgreen University Hospitals NHS Trust 2010). On the same day, the outline business case for the £450 million in hospital in Hartlepool was rejected (HM Treasury 2010b). The Trust sponsoring the project had planned to use a new procurement model involving a combination of 91% public finance and the remainder private equity (North Tees and Hartlepool NHS Foundation Trust 2010a). The intention was to transfer construction risk to the equity providers while securing a lower cost of finance on the deal as a whole. However, the Trust was requested by the Treasury and Department of Health to resubmit its project on the basis of a standard PFI scheme, and has now adjusted its business case in such a way as to demonstrate a value for money saving through PFI (North Tees and Hartlepool NHS Foundation Trust 2010b).

[24] Formally, these schemes will be carried out on a "non-profit distributing" basis. However, this is a minor variant of the PFI model. The key difference between the approaches is that, whereas in traditional PFI the capital invested by the private sector includes a small amount of share capital, in NPD all the capital provided is in the form of loan stock. Thus, while investors receive a return on their capital in the NPD model, as they do under PFI, the level of return is "capped" at the point that contracts are signed, and any surpluses remaining at the end of the contract are passed to a designated charity. This is distinct from the traditional PFI model, in which surpluses are distributed to SPV members in the form of dividends. While this could limit profitability for some investors, there is no evidence this will reduce the cost to the public sector (Hellowell and Pollock 2009).

delivery of services" (p.4) which, if achieved, will continue to meet the ESA off-balance sheet criteria described above. Further discussion of this review is contained in Chapter 9.

Figure 2.3 Number & capital value of PFIs in procurement (March 2011)



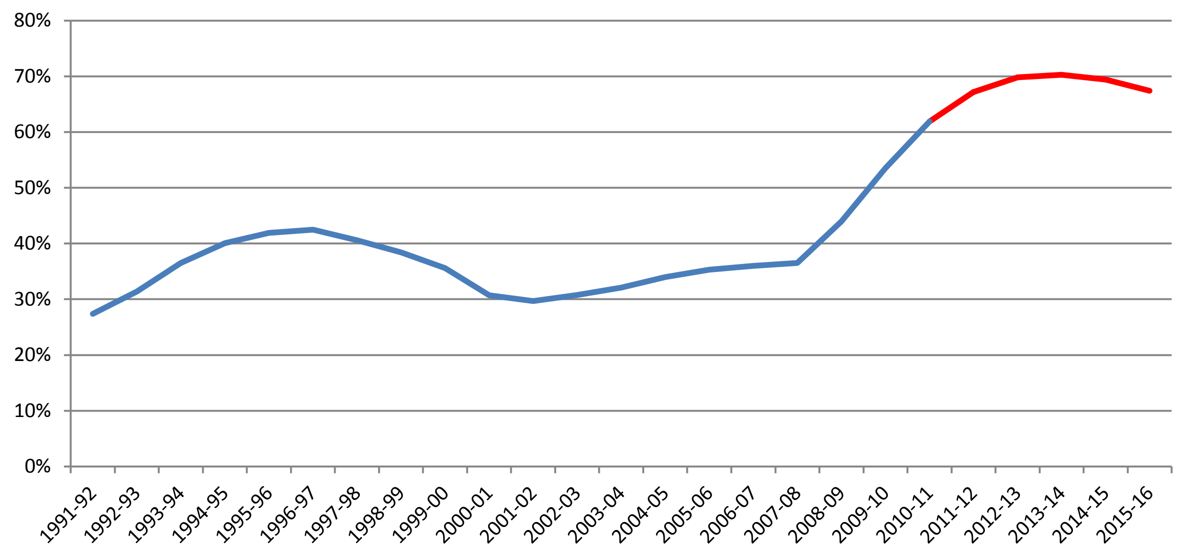
Source: HM Treasury (2011b)

The expansion of private finance will add to the annual cost of existing contracts. As of March 2011, the capital value of signed PFI contracts was £61.9 billion in 2010 prices (excluding the now defunct London Underground "infraco" contracts, which had a capital expenditure value estimated at £18 billion) (HM Treasury 2011b). The annual cost of PFI contracts is currently £8.57 billion, and this will rise incrementally over the next few years, reaching a peak of £9.75 billion in 2017-18, before falling steadily to reach £2.2 billion in 2040-41. In cash terms, assuming average inflation of 2.5%, the outstanding public sector liabilities accruing to PFI contracts is estimated to exceed £210 billion (HM Treasury 2011b).

The off-balance sheet potential of PFI projects (as described in section 2.3 above) makes the model especially attractive in the context of the current constraints on the public finances.

Much public debate has focused on the size of the deficit between government revenue and spending (which is, at the time of writing, equal to around 10% of the UK's Gross Domestic Product) (HM Treasury 2011d). In addition, the total stock of PSND is due to rise significantly in the next five years (see Figure 2.4 below). As noted, off-balance sheet investment is not included in debt and deficit measures while unitary charges only do so as they are paid. Consequently, through the use of PFI, the government can continue to invest without that investment scoring immediately on the headline debt and deficit statistics. The incentive to use PFI will become particularly strong by the middle of the current decade, since the coalition government's fiscal rules require the UK's total stock of debt as a ratio of GDP to be falling "at a fixed date" of 2015-16 (Office for Budget Responsibility 2011a, p.154).

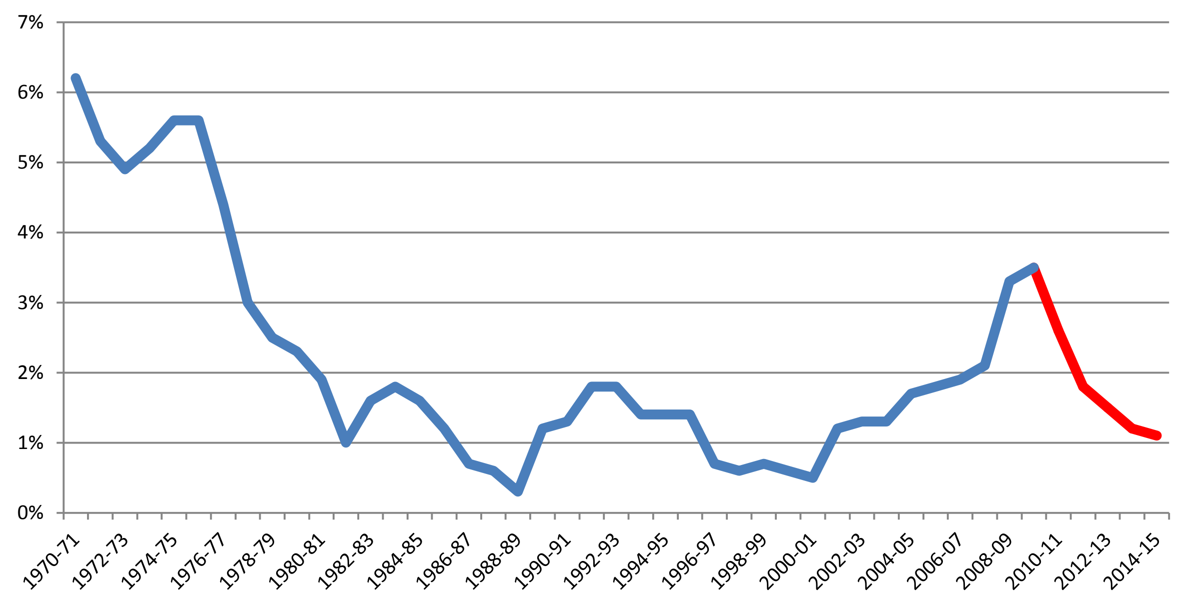
Figure 2.4 Actual/ projected public sector net debt as % of GDP



Source: HM Treasury (2011d)

One part of the coalition government's efforts to achieve a fiscal surplus by 2015-16 is its plan to reduce public capital expenditure at a very rapid rate (see Figure 2.5 overleaf). In his June 2010 Budget speech, the Chancellor of the Exchequer, George Osborne, argued that the “error” of the Conservative administration in the early 1990s had been to cut capital spending excessively, and he insisted this mistake would not be repeated. “We have faced many tough choices about the areas in which we should make additional savings, but I have decided that capital should not be one of them,” he stated (HM Treasury 2010c). However, public sector net investment (PSNI) is to fall by more than 50% over five years, from £49.5bn in 2010/11, to £24.2bn by 2014/15 (HM Treasury 2011d). As figure 2.5 (below) shows, this is a faster rate of reduction in capital investment than has occurred at any point since the early 1970s. Even as a percentage of national income (GDP), the reduction in net investment that took place in the early 1990s was significantly less radical than that now be planned.[25]

Figure 2.5 Actual /projected public sector net investment as % of GDP



Source: HM Treasury 2011d

[25] In fact, the political management of the reduction to investment in the early 1990s bears striking similarity to the current Chancellor of the Exchequer’s approach. The previous phase of rapid reduction in investment was outlined in Treasury documents published at the time of the Autumn Budget statement in November 1992 (which introduced the PFI, as noted). In his accompanying speech in Parliament, the then Chancellor Norman Lamont said: “Restraint on current spending has made it feasible to provide more protection to capital, and we have done so across a whole range of programmes. Next year there will be a significant increase in the volume of road building” (House of Commons debate, 12 November 1992, vol .213, cc 993-1016).

In the last two years, the network of government and quasi-government organisations that formulate PFI policy and manage the programmes of projects has changed significantly. Between 2000 and 2010, the fulcrum of PFI policy-making was, as noted above, PUK. However, PUK has recently embarked on a process of disposing of its various businesses and is expected to cease operations during 2011. Its former chief executive, James Stewart, was in 2010 transferred along with most of his senior colleagues (and the Treasury's private finance unit) to Infrastructure UK (IUK), a body established within the Treasury in 2009. IUK has overall control of UK infrastructure policy, including the PFI. Stewart has since has taken a role as head of the infrastructure advisory group at the financial consultancy KPMG.

At the time of writing (December 2011), IUK's chief executive is Geoffrey Spence, a previous head of PFI policy and former executive at Deutsche Bank and HSBC (as noted above). Most of the project-development tasks previously undertaken by PUK are now the responsibility of Local Partnerships, a non-departmental public body jointly owned by the Treasury and the Local Government Association (a representative group for local authorities in England) and led by chief executive Helen Bailey, a former director of public services at the Treasury. A small team of officials and seconded private sector PFI specialists continues to co-ordinate the PFI programme within the Department of Health (Public Accounts Committee 2010).

2.5 Conclusion

This chapter has provided an analysis of the model's development, scale and operation in the NHS. It has been shown that the PFI is a major call on the revenue of the NHS, and that the financial burden will increase over the next few years as new contracts are signed for projects currently in procurement. The outline of the methods by which PFI assets, expenditures and liabilities are recorded in public sector financial reporting shows that a "fiscal incentive" for the public sector to pursue private finance has been influential in driving the use of PFI by successive governments, and this incentive remains in place despite recent changes to the accounting framework. Indeed, this incentive may be stronger in the context of rapidly diminishing public sector capital investment and the political priority afforded to eliminating the deficit by 2014-15. In addition, an account of the model's historical development illustrates the ideological and political importance of the policy for successive governments, and the bureaucratic, legal and personnel changes that have taken place to enable its implementation and expansion – in particular, the influx of private sector professionals into the bureaux formally tasked with formulating PFI policy and managing the programme. In considering the core empirical elements of this thesis, which examine the structure and competitiveness of the market and the returns that market players are able to secure, the extent of private sector influence and power in the formulation and implementation of PFI policy is of core significance, a point returned to in Chapter 9.

3. PFI in the NHS: procurement, contracts, cash flow and risk

3.1 Introduction

Drawing on government documents and corporate literature, this chapter identifies the salient features of the PFI model in terms of its operation in the NHS. It examines how PFI projects are procured and appraised by public sector organisations, how the private sector counterparty in a PFI project is owned and financed and how the revenue generated by the private sector counterparty is allocated to the different companies involved. The identified features of ownership and cash flow distribution are used to provide an analysis of the total allocation of project risk to (a) the private sector counterparty, and (b) the firms within the private sector counterparty. In doing so, the chapter provides the data and analysis required for interpreting the main empirical findings of this study, presented in chapters 7 and 8.

Specifically, the examination of the procurement process identifies the principal institutional features of the (heavily standardised) mechanism by which market share is allocated by public sector organisations to investors, while the analysis of the appraisal process identifies the extent to which central government oversight provides a check on projects that experience limited competition and/ or high bid prices. The examination of the PFI model's contractual, cash flow and risk allocation characteristics provides the data and analysis required to understand the magnitude and types of risks borne by investors, thereby identifying the institutional features upon which the evaluation of returns will be based.

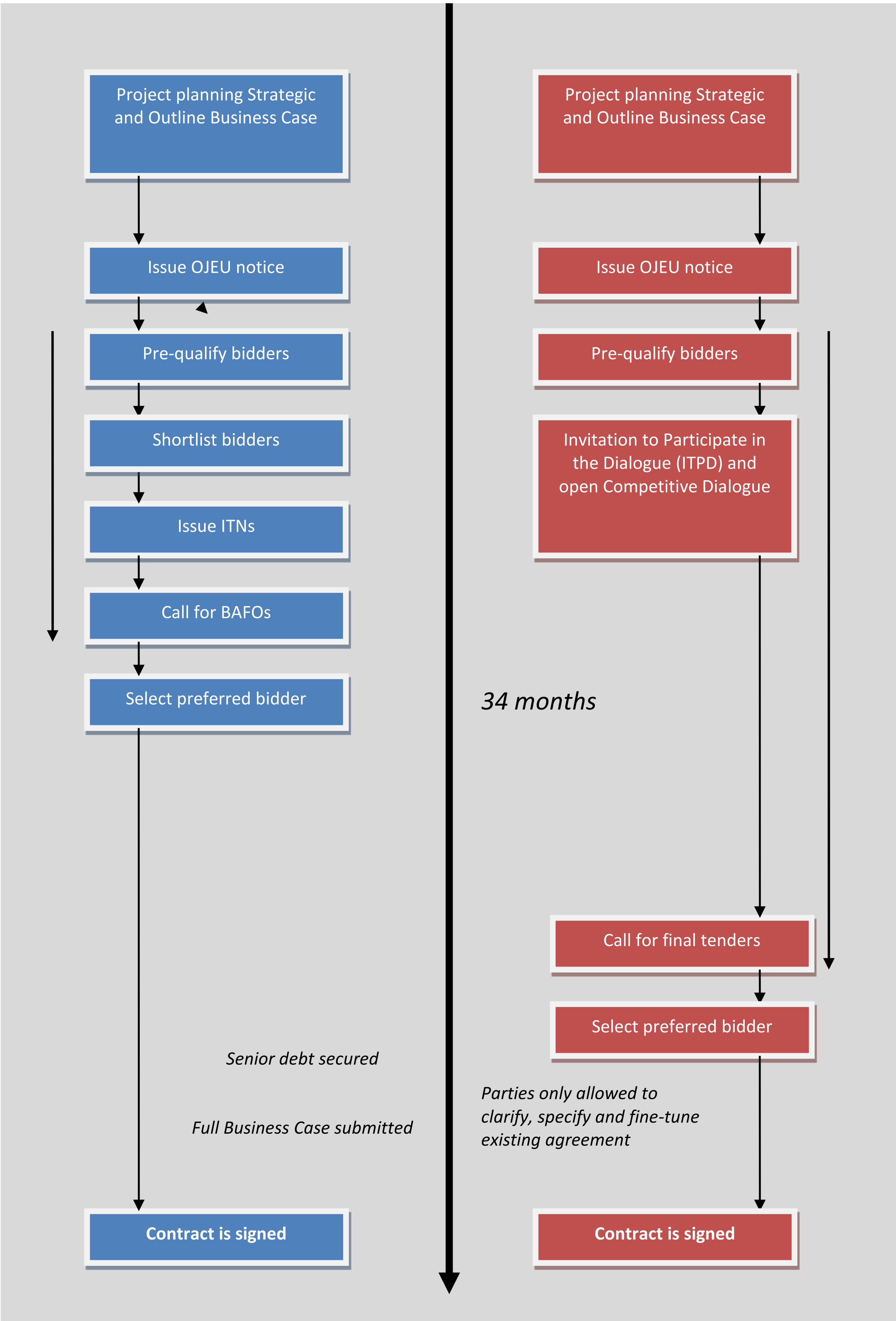
3.2 The procurement process

Contracts for PFI projects are allocated to private sector consortia through a *procurement process,* in which public authorities invite tenders and select a winning bidder for the project. The nature of the procurement process is standardised across the public sector and is subject to regulation by government departments, the Treasury and the European Union. Prior to January 2006, most PFI schemes in the NHS were procured under the so-called *Negotiated Procedure*. Under this system, the procurement process is initiated through a tender notice in the *Official Journal of the European Union,* in which under EU regulations all major public purchases of goods and services must be advertised (National Audit Office 2007b). Following expressions of interest from companies and consortia, the public authority issues a *Pre-Qualification Questionnaire* to bidders and produces a shortlist of those eligible to proceed. *Invitation to Negotiate* documents are issued to shortlisted parties. At this point, detailed solutions based on a full project specification are drawn up by bidders. (This is sometimes split into preliminary and final elements, and is often followed by a *Best and Final Offer* stage). Following this, a *Preferred Bidder* is appointed – after which there is an extensive process of exclusive bilateral negotiation (National Audit Office 2007b).

However, the regulations governing this process were changed in January 2006, when amendments to EU Procurement Directives were implemented into UK law. NHS organisations, like all other public authorities, are now expected to use a procurement procedure known as *Competitive Dialogue* for PFIs and other complex projects. Under this procedure, substantive details of a PFI deal such as output specification and pricing have to be agreed with all bidders before a single preferred bidder is appointed. The idea is that competitive tension is maintained for longer and the scope to make significant changes to the deal once the competition has been completed is limited (National Audit Office 2007b).

One of the main features of the new procedure is that there is less scope to make changes to a project after a preferred bidder has been selected. Although there is flexibility within the Competitive Dialogue regime for bidders and the authority to discuss how the output specification will be met, once the competitive phase has closed, the regulations stipulate that bidders may only be requested to “fine tune, specify and clarify their bids” (Office of Government Commerce 2006). Any change to the preferred bid must not substantially modify what had been agreed during the competitive stage of procurement (i.e. in the case of the PFI model, the Invitation to Negotiate stage). However, it is not yet known how these regulations have been translated into procurement practice in terms of NHS PFI contracts.

Figure 3.1 The PFI procurement process: pre-and post-January 2006



In the NHS, the procurement process runs in parallel with a process of central government approval. Across the UK, all NHS organisations proposing major capital investments are required to consider doing so via a privately financed scheme rather than through conventional procurement (Department of Health 2008). A proposal for a project comes from the NHS organisation, having secured the explicit support of local health care purchasers – at the time of writing, Primary Care Trusts. All 'major' projects (defined, prior to September 2005 as those involving a capital cost of over £25 million and £75 million thereafter) are required to go through the formal process outlined below (NHS Executive 1999; 2002; Coates 2005; Department of Health 2008). This process applies only in England, but analogous procedures have been followed in the other countries of the UK during the periods in which these administrations have promoted PFI (i.e. this excludes Wales in recent years). The main exception is that the functions of Strategic Health Authorities identified below are performed by the health departments within the devolved administrations.

The approval regime is as follows (NHS Executive 1999; 2002; Coates 2005; Department of Health 2008):

1. NHS Trusts, supported by their main purchasers, draw up a 'Strategic Outline Case' which identifies the health service need for the desired investment. Prior to September 2005, these documents were approved by both the Department of Health and Strategic Health Authorities. After this date, only the approval of Strategic Health Authorities was required.

2. Between 1997 and 2005, the SHA-approved cases were submitted to the NHS Capital Prioritisation Advisory Group at the national NHS Executive. This Group recommended to

the NHS Executive and in due course to ministers which schemes should be allowed to proceed to the next stage. Since 2005, this prioritisation process has been discontinued.

3. An approved Strategic Outline Case is then developed into an 'Outline Business Case', in which the rationale for the project is outlined in substantial detail for ministerial approval.[26] This sets out a cost-benefit appraisal of the investment options for achieving the health service need identified in the Strategic Outline Case. This is also the point at which the decision to proceed with a PFI or conventionally financed project is outlined and explained. The OBC includes details of a 'Procurement Route Comparison', in which the projected discounted cost of the proposed PFI project is compared with that of an identical scheme carried out through conventional procurement – the *public sector comparator* (PSC).

The specific content of this process has changed over time. Prior to 2004, there was a purely quantitative comparison of projected net present costs between the two models (the PFI and the PSC). These models were continually updated throughout the process of procurement, so that the PSC functioned as both a real-time comparator for the cost of the PFI bids and as a kind of "shadow bid" – i.e. a competitor to the prices being offered by the real bidders (*econ* 2004). Since 2004, the process has incorporated a *qualitative assessment*, designed to establish whether there is a *prima facie* case for the use of private finance, in addition to the *quantitative assessment*, in which estimates of the cost of the PFI are compared to that of an equivalent scheme carried out on the basis of public financing

[26] The Outline Business Case for a the most recent PFI scheme to reach this stage (sponsored by the Royal Liverpool and Broadgreen University Hospital NHS Trust, which has an estimated capital expenditure value of £243.9 million and was approved by the coalition government in June 2010) runs to more than 1000 pages.

(Coulson 2008). The PSC generated for the OBC is no longer updated during the process of procurement, with the result that its function as a "shadow bid" has been discontinued.

Currently, these assessments are governed by two suites of guidance documents prepared by central government: namely, *The Treasury's Value for Money Assessment for PFI: Guidance for NHS build schemes,* prepared by the Finance and Operations Directorate of the Department of Health, and *Value for Money Assessment Guidance* and the associated *Quantitative Assessment User Guide*, prepared by the Treasury. Both suites of guidance reflect principles laid out in the Treasury's (2003a) "Green Book" investment appraisal guidance, which regulates the process of project evaluation by public officials. The guidance consists of a spreadsheet containing a standardised formula, which is populated by project-specific cost estimates provided by the procuring authority (though certain parameter values are 'hard-wired' into the model). This is accompanied by the Treasury's *User Guide*, and sector-specific guidance from the Department of Health (Department of Health 2005).

Briefly, the quantitative assessment, as outlined in current guidance (HM Treasury 2007b), proceeds as follows. Two models are constructed (one for PFI and one for conventional procurement) in which the specification of the facility is the same, as are many of the projected costs and risks. However, risks that in the sponsoring authority's view would be borne by the public authority under conventional procurement, but which in the PFI solution would fall on the private sector, are valued and added to the costs of the conventional procurement alternative. In the Treasury spreadsheet, risks transferred to the private sector in this way are identified as *optimism bias* – i.e. the likelihood that actual capital and operating costs might be higher than those estimated at the time of the OBC.

Also added are the projected costs of maintaining the conventionally-procured facility to the same standard as that envisaged in the PFI model, both during the life of the project and for several years thereafter. It is assumed that the cost of lifecycle maintenance (i.e. major works) under the PFI option will be significantly lower than under the conventional procurement option. The resulting projected costs are discounted at an annual rate of 3.5% in real terms (i.e. 3.5% plus the projected rate of inflation – normally referenced to the GDP deflator in accordance with the 'Green Book' guidance on investment appraisal). This discounted cash flow analysis produces a Net Present Cost (NPC) figure for each model.

In principle, the purpose of the Procurement Route Comparison is to determine which route should be undertaken. To ensure that the comparison is fair, the Treasury (2003b) formally advises government departments to ensure that all options considered are fundable. Thus:

> "Should the specific characteristics of the project suggest that value for money would best be achieved through alternative procurement options, there should be sufficient flexibility within internal budgets for investment to ensure that the best value for money options are taken forward" (HM Treasury 2003b, p.81).

However, in reality, there is often very little chance of the publicly financed "option" being delivered, due to the likely absence of a sufficient capital budget (Treasury Select Committee 2011). As Peter Coates, the Commercial Director of the Department of Health states in oral evidence to the House of Commons Public Accounts Committee (2010) on 24th November 2010, PFI enabled the Department of Health to circumvent Treasury controls on publicly funded capital expenditure. He added:

> "[Trusts] could only have chosen PFI because of the balance sheet treatment. All I can say is that the Secretary of State at the time in 1999-2000 said: 'PFI is the only game in town'."

As the public sector comparator is not normally fundable, the procuring authority faces a strong incentive to ensure that the appraisal process finds in favour of the PFI option. As a result, the assumptions made in the procurement route comparison process are, as the National Audit Office notes (2009, p.46), "susceptible to manipulation". As discussed in Chapter 5, the veracity of the appraisal process has been questioned by many researchers.[27]

4. Prior to March 2006, a 'Full Business Case', reflecting updated cost estimates and the proposed contractual details, was produced after a preferred bidder was appointed. This was continually updated throughout this period of procurement according to the changes to the specification of services, pricing, risk transfer and other elements of the bid. The final version of the FBC - i.e. the '(Final) Full Business Case' - was submitted to ministers for approval immediately prior to financial close.[28] In recent years, this process has been revised, reflecting the introduction of the Competitive Dialogue procedure and the reduced likelihood of there being significant changes to the key features of the project during the preferred bidder stage (see above). On current guidance (Department of Health 2008), the

---

[27] As Section 2.3 indicates, these incentives apply across government. However, the NHS capital charging regime, which operates throughout the UK (see Chapter 1) creates a particular variation of the incentive structure faced by procurers. Under this regime, assets held by the organisation are depreciated or re-valued periodically, and the sum of the debt and public dividend capital held by the body has to be adjusted to match the revised value of assets. A payment is made to the Treasury by the organisation for the use of its assets equal to 3.5% of their value (down from 6% between 1991 and 2003). Every one pound fall in the valuation of the assets means that a 3.5 pence (and previously 6 pence) lower capital charge has to be paid. This impacts on the procurement route decision, as PFIs are structured either as an annuity or with an increasing (in nominal terms) payment profile. Given affordability constraints (see Chapters 1 and 5) this makes the PFI option more attractive to an NHS Trust than it would otherwise be. Over time, however, the advantage diminishes and eventually reverses. Short-termism may favour PFI despite its financial impact in the long term.

[28] Henceforth in this thesis, the term 'Full Business Case' refers to the '(Final) Full Business Case' version.

FBC is produced and assessed by the Department of Health immediately before a preferred bidder is appointed, with cost estimates and contractual details reflecting the final tender of the bidder about to be appointed. The (Final) Full Business Case, sometimes called the Appointment Business Case, that is sent to ministers immediately prior to financial close is a less comprehensive document than was the case under the pre-March 2006 arrangements, and merely confirms that the substantive features of the project outlined and approved before a preferred bidder was appointed remain the same (Department of Health 2008).

3.3 The special purpose vehicle

Once the procurement process is concluded, the contract is signed by the NHS organisation and the private sector preferred bidder (resulting in “commercial close”), which simultaneously signs a financial agreement with the senior debt provider (“financial close”). The preferred bidder is constituted as a limited company - a *special purpose vehicle* (SPV) – the key functions of which are to: (i) commission and manage the design, build and operation (DBO) of the contracted facilities; (ii) earn an income through levying the unitary charge; (iii) manage the resources so accumulated; (iv) make scheduled payments of principal and interest to debt-holders; and (v) distribute dividends to shareholders (Yescombe 2008). The SPV is established by a consortium of firms often comprising at least one “operational investor” (i.e. a construction and/ or services company that also undertakes operational project tasks) and one “financial” investor (i.e. an institutional investor or an investment bank) that has a purely financial role (Yescombe 2008). The SPV has a monopoly over a project’s management and operations for the full term of the contract, except in the case of default.[29] It is the legal owner of the concession with the NHS organisation involved and the rights to earn revenue from it (Akbiyikli *et al* 2006).

The SPV structure used in the PFI programme is much the same as that used in other areas of project finance (e.g. in the energy sector). It is used in PFI projects to ensure that the financing of the project is "non-recourse" from the perspective of equity and debt investors, which have limited liability for project outcomes (Yescombe 2008). This means that where problems emerge and revenue is reduced on a specific project, the solvency of the SPV's member companies need not be threatened (Gatti 2007). The structure also helps to reduce the risk borne by senior debt providers since the SPV, as an independent company, is to a large degree insulated from the insolvency of any individual shareholder (Akbiyikli *et al* 2006). The non-recourse nature of the SPV means that it can source capital (from equity and senior debt providers) on the basis of a price determined by the risks of the project that the SPV has been established to undertake, not the market risks associated with its members.

3.31 Sources of finance

The financing of the *capital expenditure* required to pay transaction costs, buy land and design and build the facility is provided by a combination of *equity* from SPV members and *debt* from banks or the capital markets (HM Treasury 2011f). The differences between equity and debt assets are summarised in Table 3.1 overleaf. In general, equity accounts for 7-15% of the capital expenditure at the point of financial close (Yescombe 2008). Equity provides the SPV with a layer of capital which can help to absorb the adverse financial impact of any building delays or other problems in delivering the project (National Audit Office 2000). It incorporates both *share capital* and *loan stock*. The amount of share capital

[29] If a firm fails to meet its debt payments, creditors can "step in" to claim the assets of the SPV (see Table 3.1)

in the financial structure is usually very small (often less than 1% of the capital expenditure), but it has the important function of establishing the SPV members as the legal owners of the project. The use of loan stock as the primary form of equity provides two benefits for SPV members: (i) a tax benefit, due to the fact that interest on debt is tax-deductible in the UK; and (ii) an accounting benefit, as the provision of loans enables investors to receive an income even if the company makes balance sheet losses and cannot lawfully issue dividends to shareholders (Grimsey and Lewis 2004). In this sense, all forms of SPV capital functions as *equity* and is generally referred to as such, regardless of whether the capital is provided in the form of shares or loan stock (HM Treasury 2007a). From an SPV shareholder's perspective, the focus of concern is the return on both these form of capital in combination (i.e. the total return on "blended equity") rather than the return on each individual form.[30]

Table 3.1. Differences between equity and debt assets in financing a PFI project

	Equity	**Debt**
Ownership rights conferred	Equity assets are the fundamental ownership units of the SPV	Debt is not an ownership interest in the firm
Entitlement structure	An equity claim entitles the holder to claim any cash flows left in the SPV after meeting all its costs and paying contracted debt obligations	A debt claim entitles the holder to a contracted stream of cash flows in the form of interest and repayment of the principal
Priority for receiving cash	An equity holder has a lower priority for receipts of cash flows	A debt holder has a higher priority for receipt of cash flows
Tax treatment	Payments to equity holders are made out of after-tax cash flows	Interest payments count as expenses and are tax deductible
Claims on assets in default	Firms cannot be forced into bankruptcy for non-payment of dividends to equity holders	If an SPV fails to meet its debt payments, creditors can "step in" to claim the assets of the SPV

Adapted from Hillier et al (2010).

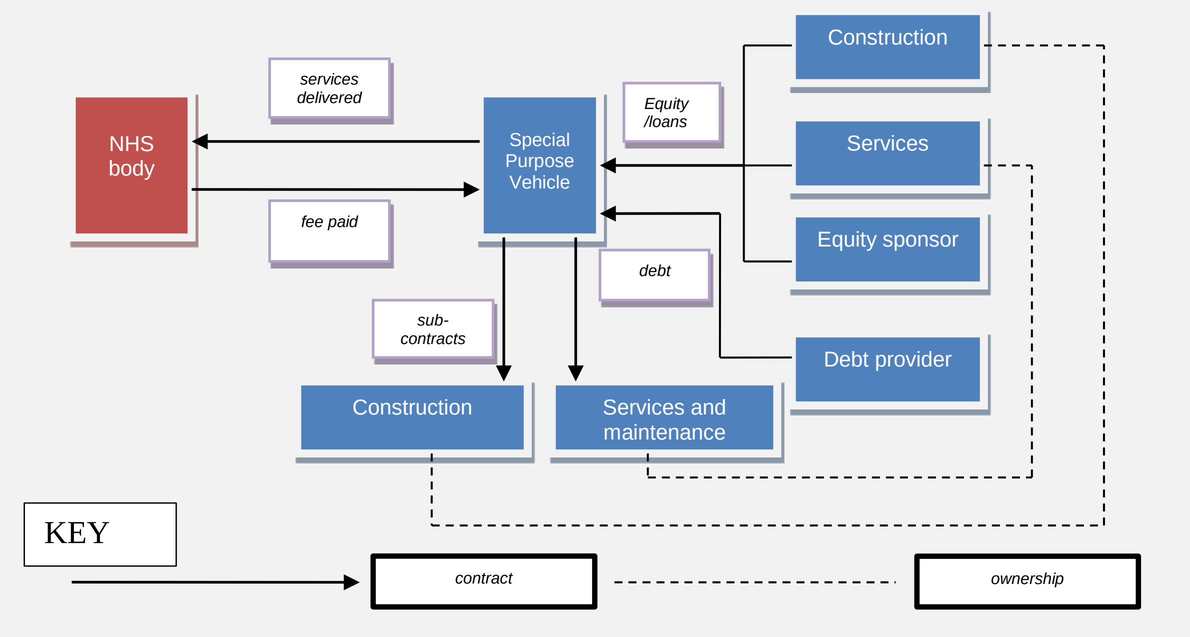
[30] Where the amount of share capital is very small, the rate of return on this form of equity will often be very large (perhaps greater than 1000%), but given the size of the stake, this is of peripheral economic significance - both for the investor and for the NHS authority that finances that rate of return (Cuthbert and Cuthbert 2007).

The remaining 85-93% of the required capital is provided in the form of debt. This comes in one of two forms (National Audit Office 2001): (1) *bank financing*, which is provided directly by a bank or a group of banks forming a banking syndicate; or (2) *bond financing*, in which a potentially large group of financial institutions are involved and the finance is organised by an intermediary known as the *bond arranger*. Debt providers have the first call on project resources in the event that income is reduced or the contract is terminated. As scheduled payments of debt interest and principal are prioritised over loan stock payments to SPV member companies (so that the degree of risk faced by the former is less than that faced by the latter), the loans provided by banks and bondholders represent the *senior debt*, and the loans provided by SPV companies are termed the *subordinated debt* (HM Treasury 2007a).

3.32 SPV project tasks

On completion of the construction works, the SPV is responsible for maintaining the facility to an agreed standard and running a suite of support services, such as catering, cleaning, laundry and portering. The SPV enters into fixed-price subcontracts with one or more firms (including the "operational" investors in the SPV) to deliver these elements of the project (HM Treasury 2007a). In return for the capital committed by investors, along with the SPV's management of the construction process and the supply of maintenance and support services, it receives a unitary charge from the NHS on a quarterly, bi-annual or annual basis.

Figure 3.2 The structure of a typical PFI hospital contract



Source: author's analysis

3.33 SPV revenue

The unitary charge is payable from the point at which the construction works are completed and the facility becomes fully "operational". As discussed in more detail below, these payments can be reduced (albeit to a limited extent) where: (1) a part of the facility is unavailable for use by the NHS commissioner due to poor maintenance; or (2) when service quality fails to comply with standards outlined in the contract (HM Treasury 2003b). A proportion of the unitary charge is indexed to inflation at the point of financial close. HM Treasury guidance (2006) states that value for money will usually be achieved by "matching indexation of the unitary charge to the underlying inflation exposure of the contractor's costs during the service delivery period of the PFI contract, on the assumption that the contractor's debt-servicing costs are fixed" (2006, p.12). The guidance further states that:

> “If the unitary charge is ‘over-indexed’ - i.e. the indexed proportion is larger than the indexed element of the contractor’s costs - this mismatch may enable the contractor to offer a lower initial unitary charge, because the extra unitary charge revenue from a higher level of inflation indexation in later years enables there to be a relative ‘back-ending’ of debt service payments and equity return” (p.13).

While the government’s guidance does not state it, there is a clear incentive on the part of public procurers to ‘over-index’ the unitary charge and thereby ease affordability constraints in the short term, but at a disadvantage to cost efficiency over the long term. Indeed, empirical evidence shows that, in practice, over-indexation has occurred in the PFI programme in the NHS (Cuthbert 2007), an issue returned to in later chapters of this thesis.

The unitary charge comprises two components (adapted from Hellowell and Pollock 2009):

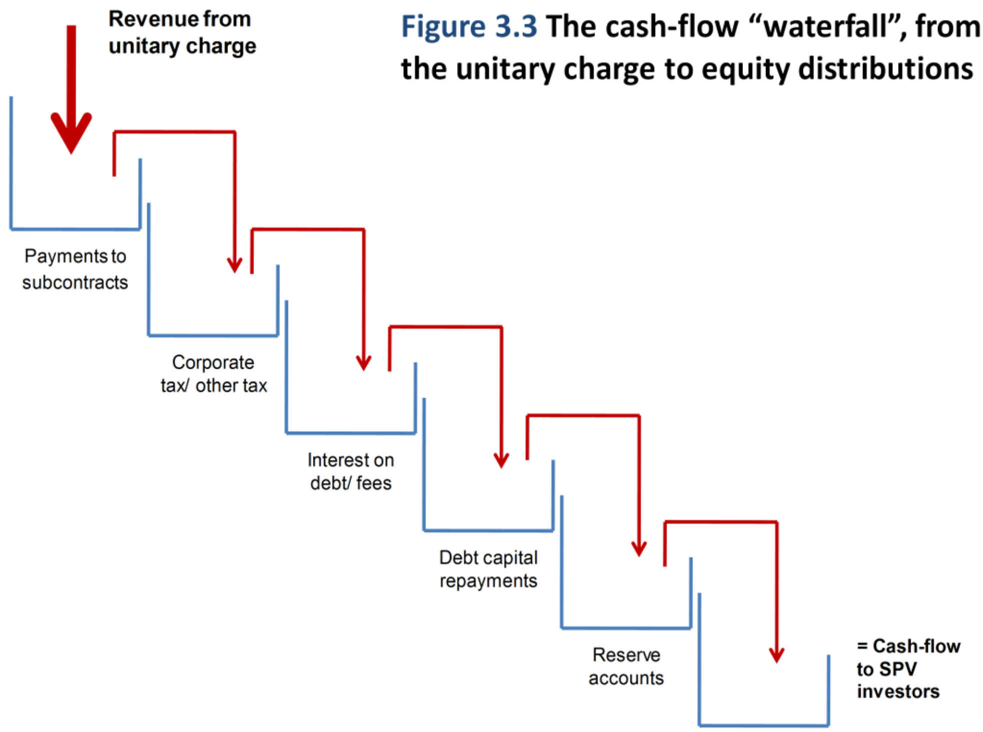
(1) The finance component. This covers the remuneration of equity and debt investors. At financial close, this is typically projected to comprise 50% to 75% of the unitary charge.

(2) The service component. This provides revenue from which the SPV meets its operational costs, in respect of maintenance (including major, or ‘lifecycle’, maintenance and routine repairs) and the delivery of services. The services element of this may be amended during the contract to reflect changing costs and market prices, either by comparing information about the current service provider’s cost of provision with comparable sources (i.e. benchmarking) or inviting other subcontractors to compete with the incumbent (i.e. market testing). These value testing processes occur at certain ‘break points’ in the operational period of the contract, typically every five to seven years (National Audit Office 2007c).

3.34 The distribution of cash-flow

Once the SPV has started operating the completed facility and is earning income through the unitary charge, the senior debt providers control the distribution of income through the operation of a cash-flow "cascade" (Yescombe 2008). The cascade metaphor captures the fact that, once all the funds required for one category of expenditure have been paid, the remaining cash available is then moved down to the next category, and so on. Only after all categories of expenditure have been accounted for is cash distributed to SPV investors. The typical order of priorities in a hospital PFI is shown in Figure 3.3 below (from Gatti 2007).

Figure 3.3 The cash-flow "waterfall", from the unitary charge to equity distributions



3.35 Reserve accounts

As shown in the illustration above, cash is paid out of the cascade into *reserve accounts*, which are under the senior lenders' control, before payments are made to SPV investors.

These accounts serve to protect the SPV's liquidity should there be a shortfall of revenue or an increase in operational costs, and build up funds for major maintenance work. The reserves also help to reduce risk of default from the point of view of the senior lender. However, as these reserves are held in deposit accounts, they provide a return on cash and, if the funds are unused, they are ultimately made available to SPV investors (HICL 2009).

On a typical NHS hospital PFI contract, reserve accounts may include (Yescombe 2008):

● a *Change in Law Reserve Account* – lenders require the SPV to establish funds for changes in law (e.g. Health and Safety law) which may require a higher level of capital expenditure;

● a *Debt Service Reserve Account* – lenders require the SPV to establish a reserve account from which debt servce can be made if normal cash-flow is for any reason insufficient;

● a *Major Maintenance Reserve Account* – major maintenance is projected to occur periodically and this account is designed to 'smooth' the impact of this form of expenditure.

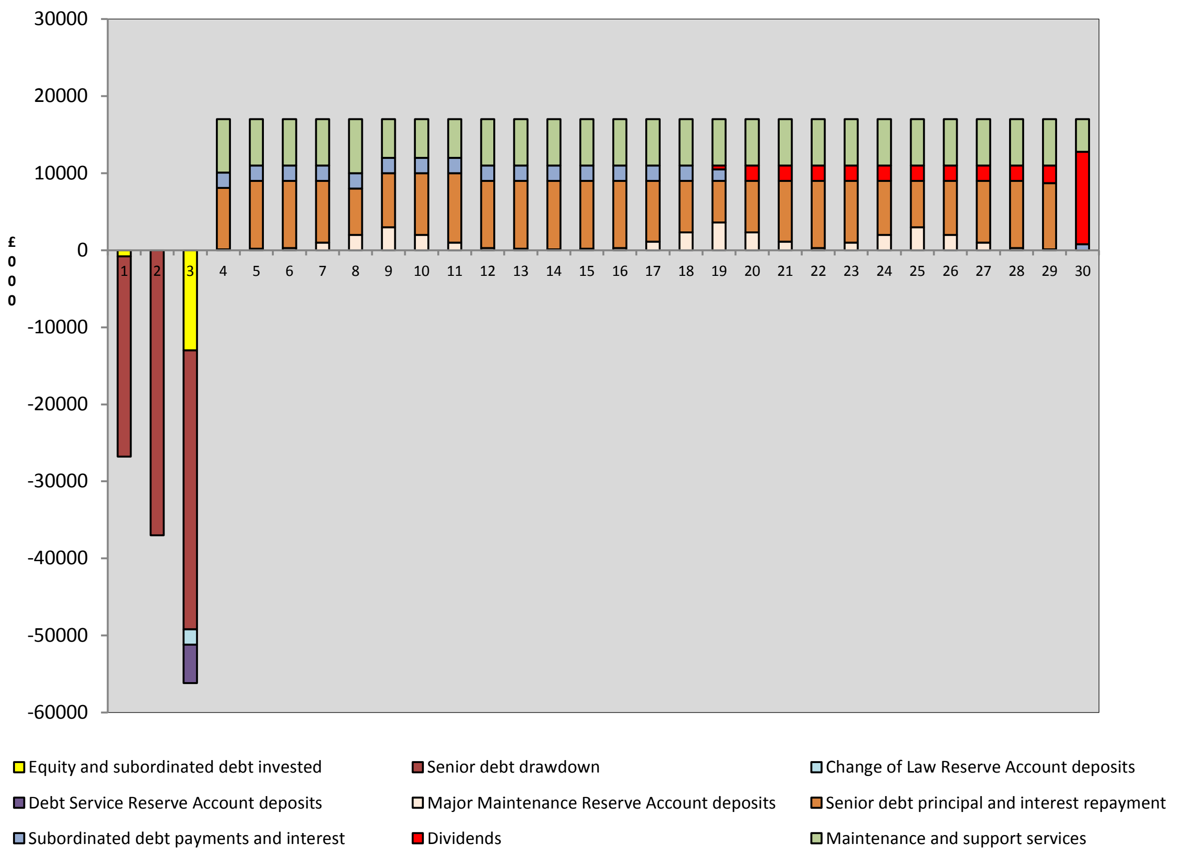
3.4 Financial dynamics

The objective of this section is to outline the key dynamics of the PFI financial structure as it operates in the NHS – in other words, the extent and timing of the cash flows into and out of a typical project. The section provides the important descriptive material required to understand subsequent chapters of the thesis, particularly Chapter 7, in which the returns to investors represented by these positive/negative cash flows are measured and evaluated.

3.41 Cash draw down and allocation

The simplified illustration in Figure 3.4 (below) shows the draw-down and allocation of cash for a generic NHS PFI project in real terms. This has been derived using the Treasury's (2007b) *Value for Money Quantitative Assessment* spreadsheet, which generates a stream of cash-flows automatically from inputs entered. The figure plots the projected cash flows generated from a number of assumptions, including: a three year construction period in which capital of £115 million is drawn down (excluding initial funding for reserve accounts); a concession period of 27 years (in which a unitary charge of £17 million is levied); an interest rate on senior debt of 6%; a debt maturity of 26 years; an Internal Rate of Return on blended equity of 15%;[31] and 100% indexation of the unitary charge to the rate of inflation.

Figure 3.4 Draw-down/ allocation of cash on a generic hospital PFI



[31] For a full explanation of the concept of 'Internal Rate of Return', see the sections below in this chapter.

3.42 Senior debt – draw-down and repayment

The bars underneath the y axis in figure 3.4 above represent the project's initial capital expenditure – i.e. expenditure incurred in procuring the asset (HM Treasury 2007b). The bulk of this consists in the cost of construction (i.e. the fixed cost of the construction subcontract). However, other uses for this finance include the refunding of bidding and development costs, banking fees (commitment and arrangement fees), and the costs accruing to the SPV's office and staffing costs (HM Treasury 2007a). As shown, this expenditure is mainly funded by the senior debt component of the financial package, which is drawn down in a series of stages during the construction phase (HM Treasury 2006). The senior debt also funds the reserve accounts in respect of *Debt Service* and *Change of Law*, which are populated, or "filled in", at the conclusion of construction (John Laing plc 2011).

The bars above the y axis show the allocation of cash between maintenance and support services, reserve accounts, and payments to investors of equity, subordinated debt and senior debt. In the graph, the cost of maintenance and support services accounts for roughly 40% of the cash-flow in each year until the final year. The major maintenance reserve account is filled periodically over the contract period. The rest of the remaining cash is available for re-payments of principal and payments of interest to the senior debt providers.

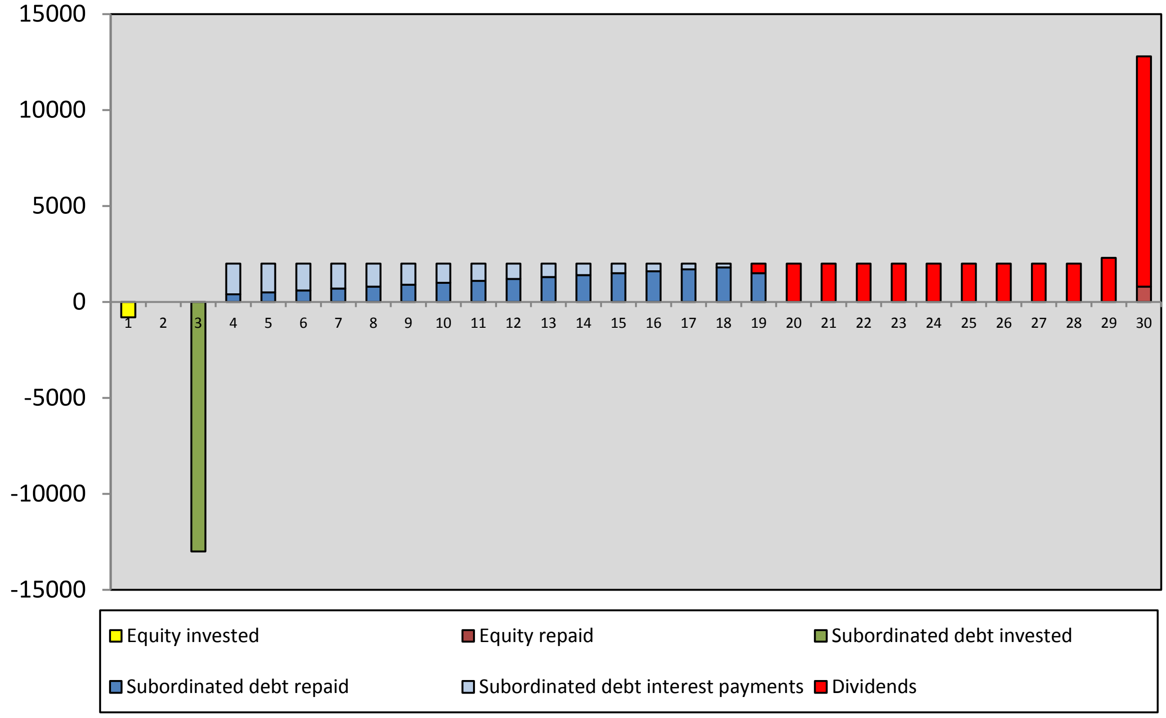
The arrangement for servicing the senior debt resembles a domestic repayment mortgage, whereby regular instalments of cash are made, often structured on an annuity basis (Partnerships UK 2008). However, the debt on PFI projects also has a "tail" – i.e. a period between the final senior debt payment and the end of the PFI contract, which may be one or several years (Yescombe 2008). The project illustrated above has a "tail" of one year.

3.43 Equity – draw-down and repayment

Loan stock is supplied by investors toward the end of the construction period and may part-fund construction and/ or some of the other items of capital cost (Yescombe 2008). As noted above, interest is earned on this debt during operations. The capital may be repaid over the early years of the contract's operation (as shown in Figure 3.4 above) or be received as a lump sum at the end (John Laing plc 2011). In contrast, share capital is typically invested at the beginning of the contract and *dividends* are received by SPV members towards the end of the contract. The (proportionally very small) capital sum is repaid in one instalment at zero interest at the end of the contract. During the "tail" period (described above) there is no payment of debt interest or principal and a significant proportion of the unitary charge is available for distribution to SPV investors. This "spike" in the distribution of dividends at the end of the contract is illustrated in the right-most bar in Figure 3.4 above.

A more detailed illustration of the financial dynamics of blended equity cash-flow, showing the breakdown between capital and interest/dividend payments, is shown in Figure 3.5 (overleaf). This uses the same assumptions as Figure 3.4 (above), but data relating to senior debt, reserve accounts and maintenance and support services expenditure is removed.

Figure 3.5 Equity draw down and cash-flow allocation in detail



3.44 Refinancing

It should be noted that the profiles of cash-flows to equity, subordinated debt and senior debt may change substantially during the operational period of the contract if the SPV opts to *refinance* the PFI project (National Audit Office 2005a). Refinancing typically takes place after completion of the construction period and more than two years into operation, by which point the riskiness of the project from the perspective of the senior debt provider has diminished significantly (i.e. the risk of credit default is relatively low). In a PFI, the term “refinancing” normally refers to one or more of the following processes (Yescombe 2008):

(i) increasing the term of the debt, thus reducing the rate of debt capital repayment;

(ii) increasing the amount of debt in the capital structure of the project, and reducing the amount of equity (analogous to the equity withdrawal process in a domestic mortgage);

(iii) securing a lower interest rate on debt, lowering debt costs and freeing up cash-flow for distribution to SPV investors; and/or

(iv) agreeing lower level of reserves with the lenders (in particular the debt service reserves), liberating income for withdrawal by equity.

However constituted, the effect of a refinancing is to bring forward the distribution of cash-flows to the SPV from that modelled at the time of financial close. Thus, cash-flow to the providers of loan stock and/or share capital in the early years of the contract is substantially increased, and cash-flow to the SPV in later years is substantially decreased (National Audit Office 2005a). The possibility of a refinancing is important to bear in mind when considering the returns to investors of blended equity. The change in the timing of payments – i.e. from the end of the concession period (as illustrated in Figures 3.4 and 3.5 above) to a few years after construction is completed - can significantly increase the rate of return *actually* earned by blended equity investors compared with the rate *projected* at the time of financial close.

3.5 Risks borne by equity and debt investors in the SPV

3.51 Contract price and the magnitude of risk borne by equity investors

It is possible that project costs and revenues will differ from those estimated by the SPV at the point of financial close. For example, construction might cost more than projected if there are delays, and these increases will be borne by the private sector counterparty. Operating the facility may cost the private sector more than projected if maintenance expenses have been underestimated. In addition, contracts allow for unitary payments to be reduced if a part of the facility is unavailable for use, or where service quality fails to meet contracted standards, so that overall project revenue may be reduced. In extreme cases, the increase in project costs and/ or the reduction in the unitary charge may threaten the ability of the SPV to make its scheduled payments of capital and interest to senior debt providers.

The quantified possibility that actual values (including costs, revenues and returns) will vary from those *expected* at the time that the initial investment is committed is how *risk* is conventionally defined in modern finance theory (Damoradan 2009), and this is the definition that will be utilised in this chapter.[32] As explained in more detail in Chapter 4 of this thesis, financial economics dictates that it is the degree of risk involved in an investment, relative to other investment opportunities in the market, that determines the "fair" return – in other words, the *opportunity cost of capital* (Kay 1976). For this analysis, the degree of risk to which PFI investments are exposed is therefore of central importance.

The link between "risk and reward" is intuitive, and one that few financial practitioners would question (Kay 2005). However, standard risk and return models in finance theory also argue that risk has to be measured from the perspective of the marginal investor in an asset, and that the investor has a well-diversified portfolio (Grout 2005). It is, therefore, only the

[32] From the point of view of a risk manager, two dimensions of risk must be considered for every exposure facing the SPV (Hampton 1993). These are: (1). *Severity* - The degree of damage to the organisation that can result from an exposure; and (2) *Frequency* - The number of times an exposure is likely to become a loss. These core principles are operationalised through statistical tools such as Monte Carlo simulation, which allow investors to consider the effect of amending all the possible combinations of risk variables (Brealey *et al* 2008).

risk that an investment adds to a diversified portfolio that should be measured by investors, and will be compensated by an increase in the required return. This view of risk leads finance theory to break the risk of an investment into two components. There is a *project-specific* component that measures risk relating only to that individual project, in addition to a *systematic* component that contains risk affecting a large subset of investments or an entire portfolio. As the latter risk impacts on the portfolio as a whole, it is not diversifiable and will require an additional reward (Grout 1997; Brealey *et al* 2008; Copeland *et al* 2005).

3.52 Project-specific risk

Some project costs are *known values* at the time of financial close. Examples of values that are known at the point of financial close include the costs associated with bidding and design, bank fees and scheduled future payments of debt principal and interest. However, many project cost items are not *known*, but *expected* values at the point of financial close. For example, the cost of construction may be more than estimated if there are delays, and the impact of this will be borne by the private sector at least up to the point that the viability of the project is not threatened (see below). Similarly, making available the contracted asset and delivering support services may cost more or less than expected if the related expenses have been estimated inaccurately at financial close. Thus, the costs of construction and operation estimated at financial close are subject to upside and downside risk – that is, actual values may be higher or lower than expected values (Yescombe 2008).

On the revenue side, most PFI contracts allow for unitary payments to be reduced in certain circumstances, for example if the asset is unavailable for use (for example due to delays in construction or poor maintenance), or where service quality fails to meet contracted standards (HM Treasury 2003b).[33] Better than expected performance will lead to an increase in revenue only in respect of construction – i.e. early completion will lead to an earlier onset of unitary charges and therefore greater revenue than projected in the financial model. However, there will be no increase in the unitary charge if the standards of maintenance or service provision are *higher* those contracted. It follows that the risks to revenues are, in contrast to those on costs, weighted to the "downside", so actual values may be lower than that expected but will not be much higher (Grimsey and Lewis 2004).

In principle, the structure outlined above involves the transfer of a number of *project-specific risks* from the public sector, which pays a fixed unitary charge, to the private sector, for whom the expected values of a project's costs and the revenues it will generate are subject to variation. However, *the likelihood that "downside" risks will impact on the projected cash-flows to project investors is constrained by risk allocation mechanisms within an SPV's contractual structure*. Below, it is shown that the bulk of risks related to a project's cost and performance are passed on to subcontractors – and specifically the firms that undertake the design and build, maintenance and support services. Indeed, case study evidence shows that the allocation of risks away from the SPV is often a necessary condition for banks or bond arrangers to provide debt for a PFI project (Asenova and Beck 2010).

[33] Since July 1999, all PFI contracts have had to follow the Standardisation of PFI Contracts (SoPC) approach published by the Treasury (2009). This guidance, which has been updated three times since 1999, prescribes a particular structure for the allocation of risk between the public authority and the SPV, and thus makes it possible to generalise about the magnitude of project risk faced by equity and debt investors in PFI projects.

(i) The design and build subcontract

The price paid by the SPV to the design and build subcontractor is fixed at the point of financial close, and construction proceeds on a 'turnkey' basis – with a single contractor taking overall responsibility for each item of the design and build process. Thus, construction risk is substantially transferred to the design and build contractor, which must deliver a functional asset within an agreed timetable, to a fixed budget, and to meet required performance parameters (Moody's 2010). At the same time, contractor performance risk is mitigated through the creation of incentive structure within the construction contract. In the PFI market, the contractor provides to the SPV a number of specific securities against its obligations, including a *completion bond* (a sum of 10-15% of the value of the subcontract, which is payable to the SPV as security for performance under the deal) and an agreement to pay *liquidated damages* (up to a capped level) to the SPV in cases where work is delayed due to factors under the contractor's control, thereby reducing cash flow to investors (Yescombe 2008).[34] For example, in the case of the Queen Alexandra Hospital PFI, which reached financial close in 2005, the construction contractor was liable for liquidated damages of up to 50% of the value of the construction contract (HICL 2010).

The transfer of risk to contractors forms part of the price they charge to the SPV, as does the projected cost of insurance, which covers potential sources of delay that are outside of the contractor's control (PFI Infrastructure Company plc 2004).[35] The final price charged by the design and build subcontractor is, in consequence, a *risk-adjusted* price. What this means is that a margin for construction risk forms part of the capital outlay on which investors earn their returns. The cost of this risk-adjustment is borne by the public procurer, as is reflected

[34] Liquidated damages are in turn due to the public sector in cases where delays cause disruption to services.
[35] Construction-related insurance covers third party liability, delay in start-up and contractor risk (HICL 2010).

in Treasury guidance which governs the process by which PFI and conventional procurement routes are compared before building projects are tendered to the market (HM Treasury 2007b). The quantitative element of this guidance exists in spreadsheet form, and includes 'hardwired' formulae which, in combination with a range of bespoke assumptions for the main items of a scheme's projected cost, generate a stream of projected unitary charges. The spreadsheet requires public authorities to assume that the *ex ante* construction cost of a PFI contract will be higher than that of an equivalent public procurement (though outturn costs are typically assumed to be lower). This higher ex ante cost is justified by the Treasury (2007b) on the grounds that "more cost and delay risk is transferred to the private sector under the PFI option" and that "the PFI partner typically succeeds in passing many of these risks down to the construction contractor through the subcontract arrangements" (p.23).

(ii) The services subcontract

In a typical PFI hospital contract the support services subcontract, which relates to activities such as catering, cleaning, portering and laundry, accounts for the great majority of operational costs (National Audit Office 2001). Payments to the services subcontractor are fixed in real terms over a five-to-seven year period (after which they may change according to market norms, under benchmarking or market testing exercises (National Audit Office 2007c)). However, any reduction in income owing to lower-than-contracted standards of delivery will be borne by the subcontractor, at least up to the point that its insolvency is not threatened.[36] A National Audit Office (2010a) examination of 76 operational PFI hospital contracts suggests that insolvency is unlikely. The report found that 53% of Trusts made no penalty deductions in 2008/09, and those that did paid relatively little (the amount always

[36] Yescombe (2008) states that penalties should be set in accordance with a subcontractor's income. He suggests a penalty of one year's fees under the FM subcontract may be the maximum penalty possible (p.224).

represented less than 5% of the unitary charge). Like that of the design and build contractor, therefore, the services contractor's fixed price includes a contingency margin for the risk it faces, and this is ultimately paid by the NHS commissioner through a higher unitary charge.

(iii) The maintenance subcontract

The detailed appraisal of whole life operating & maintenance costs, and detailed plans for periodic capital maintenance expenditures, are widely considered to be a major benefit of the PFI contractual structure (HM Treasury 2003b). The risks relating to 'routine' maintenance are passed down via fixed price contracts to the maintenance subcontractor, which also bears the risk of performance failures on a capped basis (Yescombe 2008). Many of the risks relating to maintenance are therefore contractually allocated away from the SPV. However, the degree of risk-transfer from the SPV to the contractor relating to 'lifecycle', or major capital maintenance expenditure, is lower. This is typically provided by the maintenance contractor on the basis of a *cost-plus* contract, leaving the risk of unanticipated cost changes (for example, unanticipated problems with damp) with the SPV.

To some extent, as described above, this risk is managed through the establishment of a special Maintenance Reserve Account, which provides a contingency fund for such costs. In addition, evidence from HM Treasury (2010d), obtained by the author through a Freedom of Information request[37] suggests that much of the lifecycle risk faced by investors is on the upside. In other words, actual lifecycle costs have typically been lower than the costs projected at the point of financial close, with the result that public procurers have in some cases been paying more for these services than was sufficient to meet the SPVs' expenses,

[37] This request, issued on 31 March 2010, was initially turned down on 8 April 2010, but disclosure was subsequently granted after a request for an internal review and the change of government in May 2010.

and investors have been able to increase their return on that projected. While the cost and timing of life-cycle maintenance are inherently difficult to predict, and are in this sense "risky" (Grimsey and Lewis 2004), a systematic tendency for investors to increase returns on this element of service provision indicates that a more than sufficient contingency to absorb this risk is contained in the maintenance contract price, ultimately paid by the public sector.

To summarise the above, the magnitude of *project-specific* risk faced by project investors is limited, such that the cash flows that project investors expect to earn at the point of financial close are subject to a relatively low level of uncertainty. Most elements of project cost are funded by a unitary charge that is indexed to inflation, and these are either fixed in real terms or are in any case determinable according to the contractual basis agreed (PricewaterhouseCoopers and Franks 2002). Revenue is unlikely to vary significantly, and where it does, the exposure of the SPV is limited by subcontractor covenants and bonds.

However, project-specific risks have not been eliminated altogether because the exposure of subcontractors is typically *capped* at a level that falls short of that which would threaten insolvency (HM Treasury 2007b). The result is that residual risks remain with the SPV, and may impact on cash flow in the case of extreme underperformance by subcontractors. In addition, certain cost items, such as insurance, administration and capital provisions for lifecycle costs, are subject to a greater degree of variability – and are thus risky for the SPV.

The main project risk factors are identified and described in Table 3.2 (overleaf). These have been sourced from a "placing prospectus" published by the PFI Infrastructure Company plc in 2004 (an attempt to raise £47 million to invest as equity in new UK PFI projects) in which the main risk factors facing investors in PFI SPVs were outlined by the company's directors.

Table 3.2 Project-specific risks retained by the SPV (after risk allocation to subcontractors)

RISK	DESCRIPTION
Subcontractor failure	Cash flow may be affected by the failure of parties to fulfil their contract obligations.
Incomplete contracts	Contractual arrangements are structured so as to minimise the SPV's exposure to risk. However, contracts may be ineffective in distributing risks to the degree expected at financial close, resulting in unexpected costs or reduction in revenues which could impact on returns. Project risks are passed on to insurers or to sub-contractors, but any residual risk is retained by the SPV. To the extent that the subcontractors, their respective guarantors, the relevant public authority or insurers fail to meet the obligations in respect of risks that have been passed on to them, or claims by the SPV exceed the capped limits agreed, the SPV will bear such risks.
Construction Delay	During construction, there are risks that the works are not completed within the agreed time. To the extent that such risks are not borne by subcontractors, delays or cost overruns will affect the returns to SPV investors. A delay of any kind will result in a delay in receiving monthly payments for the use of the facility and will reduce the period in which payments are received as the length of the concessions are fixed.
Termination	Contracts give the public authority and the SPV the right to terminate the contract. The compensation which the SPV will receive on termination will depend on the reason for termination. If the termination results from a failure by the SPV to meet the terms of the contract), the compensation will not include amounts specifically to repay the equity investment and may only cover the senior debt amount.
Performance	Services provided by the SPV will be monitored against agreed measures. Deficient performance can lead to deductions to payments which are only recoverable from a subcontractor up to a certain 'cap'. In certain circumstances, sustained poor performance may endanger the contract, requiring the SPV to terminate the relationship with the subcontractor and retender the contract, at a cost to the SPV.
Financing Terms	Typically, the terms of the senior debt impose financial covenants on the SPV; failure to comply may result in an SPV being unable to make distributions to equity.

Source: Adapted from PFI Infrastructure Company plc (2004)

3.53 Systematic risk

The primary source of systematic risk facing investments is the risk that changes in the level of economic activity may affect demand for the services the project provides. In the case of a PFI hospital, the degree of demand risk is typically close to zero, as even a significant change in demand for the facility would have no impact on the magnitude of the unitary charge. A small degree of demand risk is borne by the SPV in relation to 'third party revenue' – i.e. relating to rental income from retail outlets provided within the hospital. However, as this component of revenue typically accounts for less than 1% of a project income at the point of financial close (Yescombe 2008), the potential for revenue to vary due to fluctuations in consumer demand is of negligible significance to project investors.

Instead, the primary source of systematic risk facing PFI investments relates to inflation. In general, investments subject to less/ more predictable patterns of inflation require a higher/ lower expected return (Damoradan 2009). In a PFI project, inflation risk is managed through the indexation of the unitary charge (in whole or in part) to the Retail Price Index. This reduces inflation risk significantly, but does not eliminate it altogether.[38] Even where the entire unitary charge is index-linked, the returns to SPV investors will be reduced/ increased in the event that its operational costs (e.g. wages and supplies) rise more rapidly/ more slowly than RPI (Australian Government 2008).[39] If the finance component of the unitary charge is not indexed, and RPI has been projected inaccurately, there is a risk that the real value of returns will be higher or lower than expected. However, this risk is offset by a reduction in the real value of the debt to be repaid as inflation increases. Correspondingly, if deflation was to occur, the real value of the returns to investors would increase, as would the real value of the payments to senior debt (PFI Infrastructure Company plc 2004). In

[38] Indeed, where projects are 100% indexed to RPI, the primary risk facing investors is that RPI will undershoot the rate projected at the point of financial close (Yescombe 2008). If this occurs, the nominal rate of return will *ceteris paribus* be lower than that projected. Typically, SPVs manage this risk by entering into inflation-swaps (derivatives which hedge against the risk of low inflation) or index-linked loans, which can increase the finance-related costs of PFI to the public purchaser, and the 'breakage costs' of contract termination (Yescombe 2008).
[39] On some projects, the use of factor-specific indices (e.g. the Labour Price Index) will moderate this risk.

addition, as the risk of this should in principle be factored into the rate of return on government "gilt" securities (henceforth, the "gilt rate"), against which the expected return is referenced (see Chapter 7), the premium for this risk ought not to be substantial.

In Table 3.2 above, it is noted that the failure of a subcontractor to deliver services to the agreed standard may compromise the PFI contract as a whole, and thereby require the SPV to terminate the subcontract with the incumbent supplier and seek a replacement. This will lead to an immediate increase in costs (for example, the costs of retendering the contract), and may destabilise delivery of the contract. This risk is primarily project-specific and the vulnerability of a subcontractor to insolvency ought to be part of the SPV's due diligence. However, there is a degree of systematic risk here in relation to the fact that a serious or prolonged economic downturn may increase the risk of insolvencies across a portfolio – impacting on companies that previously had robust balance sheets, and thereby increasing the chance that the subcontracts will need to be retendered (Australian Government 2008).

A potential source of systematic risk in project finance contracts is that of residual value – i.e. the risk that the value of the facility and the land it occupies will vary according to the impact of changes in interest rates or changes to patterns of market demand for the services to which the project relates (Yescombe 2008). This is the overall risk that on termination of the services contract, the asset will not have the value originally forecast when the arrangements were established. In principle, an SPV that stood to gain ownership of an infrastructure asset at the end of a concession might be willing to accept a lower unitary charge in anticipation of returns from leasing or selling the asset post-contractually. Such returns would be dependent on market conditions in the real estate markets in future decades, and projected cash-flows accruing to this would be discounted at a high rate. However, in a PFI hospital project, this risk is borne by the public sector authority – which acquires the hospital for nil consideration at the end of the contract (HM Treasury 2009).

To conclude on systematic risk, it would appear that SPV investors in hospital PFI contracts are subject to a small degree of systematic risk in respect of inflation and subcontractor insolvency, but negligible risk in terms of demand and residual value. When combined with the conclusions regarding project-specific risk, it is evident that actual cash flows on a standard PFI hospital contract are likely to vary from those projected at the time of financial close only to a very limited degree. The financial and contractual structures developed over time in the project finance markets and codified in contracts standardised by central government guidance (Treasury 2009) are ones in which risks are assessed and managed assiduously, the volatility of income for the SPV is low, capital costs are fixed, operating costs are largely fixed (with reserve accounts providing a buffer to absorb unexpected costs) and inflation has a limited impact due to indexation and hedging (Balfour Beatty 2003).

3.54 Credit default risk

The section above outlines the risks faced by the members of the SPV - the providers of blended equity. However, as noted previously, the lion's share of the finance used to deliver the capital expenditure required for a PFI project comes in the form of debt – from banks or the capital markets. As with equity, the rate of return required by debt providers is in large part a function of the risk to which the debt investment is exposed. However, debt has different risk characteristics to equity, as already noted in Table 3.1 above. First, the senior debt provider receives interest and capital repayments in priority to all other distributions and its returns are therefore exposed to a lower level of volatility (and thus risk) than those relating to equity. Second, the risk faced by debt providers is, unlike that of equity providers, all on the ‘downside’. The rate of return to debt providers may be lower than is projected at the time of financial close, but it cannot be higher. Thus, it is the *risk of loss* arising from the failure of the SPV to make a contractual payment which determines the margin. This risk of loss - *credit default risk* – may be defined as the quantified possibility that the actual returns on a loan may be lower than the lender expects (Donaldson 1989).

It has two components (Dowd 1998):

(1) The probability of default: the risk that at least one scheduled payment of debt principal or interest might be missed in a case of unremediated failure by the SPV; and
(2) The recovery rate: the proportion of the outstanding debt to be recovered in default.

As noted, the senior debt provider receives interest and capital repayments before other distributions – hence its “seniority” to other forms of finance. It follows that the risk borne by senior debt providers must be of a lower magnitude than that relating to SPV capital (Yescombe 2008). Banking theory dictates that lenders will be remunerated only for risks that cannot be managed through a project’s contractual structure, and thus lenders should not demand an additional premium for risks that are allocated to the SPV or for those which the SPV succeeds in transferring to subcontractors (Blanc-Brude *et al* 2007). This latter point is crucial in determining the appropriate risk premium on senior debt since, as noted above, most risk is allocated to subcontractors through the use of fixed-price contracts for construction and operations, minimising the exposure of both the SPV and its creditors.

Moody's, one of the two main credit ratings agencies operating in the PFI market (along with Standard and Poor's) has recently published research on default and recovery rates for project finance bank loans over the period 1983-2008 (Moody's 2010). This demonstrates that the project finance industry in general (including categories of project finance with a much greater degree of market risk than obtains in a hospital PFI) exhibits credit default and recovery rates comparable to secured senior loans to major corporations. The report states:

"While it is true that most project finance borrowers are highly leveraged, thinly-capitalised Special Purpose Vehicles (SPVs) with limited financial flexibility, project finance loans are structured to be both *highly robust to a wide range of potentially severe risks, and also to minimize any post-default economic loss*. The findings of the Study suggest that the risk allocation, structural features, underwriting disciplines and incentive structures which characterize the project finance asset class have proved effective" [p.43 – author's emphasis].

In addition, PFI transactions were seen by bank lenders to "[lie] at the low-risk end of the project finance spectrum" (p.18). While the Moody's data set included "a significant number of PFI/PPPs", the number of these projects that had experienced a default was "extremely small" – indeed, too small to enable a robust statistical analysis. The Moody's report concludes: "This result is consistent with the view held by many PFI/PPP proponents that default risk for such projects is low, especially where project revenues are based on availability-based payment mechanisms as opposed to being exposed to market risk" (p.18).

Standard and Poor's (2006), the other credit ratings agency that plays a dominant role in PFI transactions (Yescombe 2008), has outlined a number of risks which in principle could result in an SPV's contract being terminated, potentially resulting in a credit default. These include: (1) insolvency of a major shareholder; (2) delays in construction in excess of 36 months; (3) a material breach of contract obligations; and (4) an accumulation of excessive penalties (i.e. reductions to the unitary charge) due to the frequent unavailability of facilities for use by the NHS purchaser. However, the fact that a credit default has (as of April 2011) occurred on only one NHS-commissioned PFI project, despite their being more than 120 in operation, suggests that the risk of default is low (HM Treasury 2011e).[40] At the same time, comprehensive modelling by Standard & Poor's specifically on health sector PFI projects (2006) shows that debt holders on these projects stand to recover between 80% and 100% of outstanding loans from the NHS purchasers in the event of a payment default. Insofar as past performance is a reliable guide to future outcomes, it is evident from the research of credit ratings agencies that the probability of credit default for a senior lender on an NHS PFI project is extremely low, while the recovery rate is very high by comparative standards.

3.6 Conclusion

This chapter has identified the procedural, contractual and financial features of the PFI in terms the NHS and an analysis of the implications of these features for the magnitude of risk borne by equity and debt investors. It has been shown that the procurement process is influenced by both UK and European Union regulation, both of which have seen substantial reform within the last decade. The early part of this process involves a degree of competitive tension between rival bidders, but this tension dissipates as procurement progresses, and ends with a period of exclusive negotiation during the preferred bidder stage. This chapter has also explained how the procurement process takes place alongside a

[40] This information was supplied to the author in a Freedom of Information response. The only NHS PFI scheme to experience a default on loan agreements to date is the Whittington Hospital PFI, which had a capital value of £31.9 million on reaching financial close in October 2002. The default occurred because Jarvis, the main investor and construction scontractor, became insolvent. It is not known how many scheduled payments were missed, or what proportion of this money was recovered by Halifax Bank of Scotland, the lender involved.

parallel regime of project appraisal and approval which is highly favourable to the PFI, in accordance with the fiscal incentives and other policy influences outlined in Chapter. It has been argued that the appraisal and approval process provides only a weak check on projects which have experienced problems, such as a lack of competitive pressure or high bid prices.

The examination of the PFI model's contractual, cash flow and risk characteristics shows that much of the risk borne by the private sector counterparty is allocated away from investors to subcontractors. Equity investors in hospital PFI contracts are subject to a small degree of systematic risk in respect of inflation and subcontractor insolvency, but negligible risk in terms of demand and residual value. It is evident that actual cash flows on a standard PFI hospital contract are unlikely to be significantly lower than those projected at the time of financial close. Project-specific risks are assessed and managed by investors so as to ensure that the volatility of revenue is low, capital costs are fixed, operating costs are stable, financing costs are hedged and inflation is mitigated by the index link of the unitary charge.

It has been shown that, from the private sector's point of view, undertaking a PFI project involves the establishment of a new business, which is financed by equity and debt and is entirely dependent on the project for income. The SPV is revealed as a highly leveraged, thinly-capitalised firm with limited financial flexibility. The debt capital provided to this vehicle is structured to be highly robust to a wide range of risks. Reserve accounts deal with many aspects of uncertainty, and returns to equity are highly "back-ended" so that the equity provider has a strong long-term stake in the project, at least prior to a refinancing. Documents from the main credit ratings agencies operating in the PFI industry demonstrate that the level of credit default risk faced by lenders is low by the standards of project finance transactions, with extremely low default probabilities and a high recovery rate.

4. Theoretical framework

4.1 Introduction

As outlined in Chapter 1, this thesis incorporates two related empirical components: an evaluation of PFI investor returns as projected at the point of financial close; and an analysis of the structure and competitiveness of the markets for PFI equity and debt. The results of these components of the study are presented in Chapters 7 and 8 respectively, while a discussion of the analytical approaches employed is provided in Chapter 6. The present chapter (i) outlines the theoretical rationale for combining these two components of the study, and (ii) reviews the theoretical literature used in developing the analytical approaches employed. A number of key concepts are also examined, including the terms "return" and "excess return", from the perspective of contemporary financial theory.

4.2 Investor returns and market structure

The relationship between investor returns and market structure – i.e. those characteristics of the market that significantly affect its competitiveness - has been an important focus of research in economics since the 1950s (e.g. Bain 1954; Chamberlin 1958; Mann 1966). In particular, the industrial organisation literature has focused on *market concentration* – the relative size of the top firms in a market – as the key indicator of competitiveness. Market concentration can range from 100%, where one firm controls the whole market, down to nearly zero where there are a very large number of firms in the market. In the latter case, the price of a product is unaffected by the influence of any one firm and all firms must set prices at the marginal cost of production, including the marginal cost of capital (Pepall *et al*

2005). In the former case, however, suppliers have a greater degree of discretion over setting the price, and will seek to generate a return in excess of its average cost of capital (Stiglitz 2000). Doing so is in accordance with the core objective of the firm, which is to maximise the value or wealth of its owners (i.e. current shareholders) (Hillier *et al* 2010).

Where a market consists of a small number of firms relative to demand, economists call this an *oligopoly*. An oligopolist may engage in collusion, either tacit or overt, and exercise market power through a cartel (Krugman and Wells 2009). In an oligopoly, firms are aware of each other's presence, and recognise that their individual long-term interests are influenced by the interests of the industry as a whole. Even in the absence of overt collusion, they will have regard for the anticipated prices of their market rivals when they set prices and the level of return for investors they will accept (Sclar 2000). Here, the *entry and exit dynamics* of a market play an important role (Goddard *et al* 2001). If the market facilitates entry by new firms and enables the exit of incumbents, the market power of firms is curtailed. Conversely, if market structure in some way prevents entry and exit, competitive tension will be weak and there will be limited pressure on firms to lower prices.

Within the Structure-Conduct-Performance hypothesis, market concentration is regarded as the key determinant of the rates of return earned by firms' investors (Shaffer 1994). Indeed, as George Stigler[N], one eminent exponent of the SCP hypothesis, noted (1968, p.30): "the very purpose of measuring concentration is to predict the extent of departure of price (or alternatively, of rate of return) from the competitive level." The SCP hypothesis is derived from modelling firm behaviour in conditions of oligopoly, and implies, in accordance with the above, that collusive activity is easier to maintain in concentrated markets (Stigler

1964). Most early empirical research based on the SCP paradigm focused on the relationship between market concentration and performance measured by profit. A positive correlation between concentration and profit was interpreted as evidence that firms act collusively in order to achieve a high rate of return (Molyneux and Thornton 1992). Since Bain's (1951; 1954) work demonstrated a relationship between high concentration and high returns, this has been confirmed in hundreds of studies, including the large studies of Leonard Weiss (1974, 1989). Weiss (1974) surveyed empirical findings from dozens of studies relating industry profitability to market concentration and concluded that a positive relationship existed. A second study, incorporating a cross-market and cross-national industrial survey (1989), showed that high concentration correlates with high prices across a wide spectrum of markets involving different product and geographic markets, countries, and time periods.

The idealised market within the SCP view is highly competitive - one in which high prices and excess investor returns are quickly eliminated by rival competitors and the ability of new players to enter the market. In such a market, it is impossible for a small number of firms to dominate the market (Scherer 1982). Conversely, markets characterised by one firm (monopoly) or a few firms (oligopoly) with significant disparities in market share are likely to be characterised by collusive agreements, higher prices and excess returns to investors. Proponents of this approach tend to view existing markets as imperfect in their competitive structure, and in need of regulation in order to prevent market abuse (Weiss 1974). Reflecting this, comparing the return actually achieved by firms with their average cost of capital is a commonly used practice among competition authorities, and is central to identifying sectors of industry in which firms are able to exert market power (*econ* 2004).

4.3 Oligopoly and the PFI procurement process

Industries differ in their structures, ranging from the situations where there is a multiplicity of small producers, through more concentrated markets with a smaller number of producers, in some cases including a so-called 'competitive fringe' (Baldwin *et al* 2010). Where a concentration in market share leads to a reduction in the competition for contracts, this may confer substantial advantages on bidding firms when bargaining with public authorities. As noted previously, in PFI, market share is allocated to firms through a process of *procurement* – i.e. competition *for* the market as opposed to competition *in* the market. It is therefore evident that the dynamics of public-private negotiations are an important influence on market structure. Specifically, features of the procurement process such as the scale of bidding costs, the number of bidders involved and the extent of exclusive bargaining are likely to have a material impact on competitiveness (Välilä 2005).

It is useful to locate the procurement process theoretically. Using the terminology of auction theory, the competitive phase of procurement may be described as a *first-price, sealed-bid auction*, albeit of a particularly sophisticated form (Hendricks and Paarsch 1995; Laffont 1997; McAfee and McMillan 1987, Milgrom 1989). The procurement process consists of an informed purchaser (i.e. the NHS organisation) whose budget constraint is not revealed. Bidders submit sealed bids (in that rival bidders cannot know their content), and win the right to enter the preferred bidder stage of procurement if and only if they offer the optimum combination of price (including the price of finance) and quality (Klemperer 1999).

Auction theory predicts that we would find a negative relationship between the number of bidders and price (including the price of financing), as more bidders in the procurement process provide a greater degree of competition (Klemperer 1999; Milne and Wright 2004; Gómez-Lobo and Szymanski 2001). Bulow and Klemperer (1996) show that a competitive tender is in most circumstances preferable to negotiations with one bidder, which suggests that the benefits of competition tend to outweigh what can be achieved through negotiating skills alone. Using data from highway construction projects in Florida, Gupta (2002) shows that the price of winning bids decreases with the number of bidders, although this relationship ceases to exist when adding additional bidders to an already large number. Gupta finds a decrease in the winning bid until there are about six to eight bidders, which in his view suggests that procurements become competitive with around eight bidders.

As a report on the impact of public procurement on market competition, commissioned by the UK Office of Fair Trading, states:

> "More bidders make for more intense competition [in a procurement], resulting in lower prices and better quality. Even though the incremental benefits from allowing more bidders to participate may become smaller as the number of firms increases, in most circumstances adding bidders increases the level of competition. This would suggest that any features of public procurement processes that limit participation will have a detrimental impact on competition in the short term" (*econ* 2004, p.70).

It is evident that the number of bidders – the source of competitive pressure – must be sufficient to ensure that the price of finance (along with the other aspects of the project) is set at the efficient level (National Audit Office 2009a). Evidence from the refuse sector suggests that there is a positive relationship between the intensity of competition in the bidding process and the extent of reductions in price (Szymanski 1996). As Klemperer notes:

> “The received theory described above takes the number of bidders as given. But the profitability of an auction depends crucially on the number of bidders who participate, and different auctions vary enormously in their attractiveness to entry; participating in an auction can be a costly exercise that bidders will only undertake if they feel they have realistic chances of winning” (Klemperer 2003, p.10).

Certainly, the benefits of competition in bidding are assumed by policy-makers in this area, and competition is one of the key claimed comparative advantages of the PFI procurement process. The Treasury (2003b) states, for example, that: “[PFI] allows the public sector to harness the efficiency that comes from contestability in procurement” (p.48). However, the competition effects of choices made in the design of procurement processes are complex and often require a trade-off between costs (e.g. the administrative cost of running a tender with more bidders) and benefits (e.g. the expected reduction in price as a result of more intense competition). In complex procurements, where the buyer's needs are multi-faceted and requirements cannot be specified in a simple way, the transaction costs associated with searching for and negotiating with a number of bidders may be high, and seen by bidders as prohibitive. In addition, where decisions are made on the basis of distorted incentives (such as those that generated by the reliance on one particular model of procurement), even a well-designed procurement process may fail to promote competition or lead to avoidable restrictions or distortions of competition (*econ* 2004).

The Transaction Cost Economics (TCE) framework pioneered by Oliver Williamson (1985; 1990) has been used to provide an account of *why* PFI projects are likely to be associated with higher transaction costs than other forms of public-private sector contracting. In the TCE framework, economic actors are constrained by *bounded rationality*. Since there are limits to the amount of information that an individual can store and process, those involved in purchasing or supplying services are unable to develop complete contracts when engaging with third parties. This is especially problematic when the self-interest orientation of actors is characterised by *opportunism* – or "self-interest seeking with guile" (Williamson 1985, p.47-8). When opportunism on the part of a supplier is combined with the bounded rationality of the purchaser, the supplier may be able to take advantage of lacunae in the purchaser's knowledge to increase its return. For example, during operations, the supplier may be able to make use of gaps or ambiguities in the output specification by reducing the quality of the services being purchased without formally violating the contract (Hart 2003).

The impact of the behavioural context on contract outcomes is dependent on two key dimensions of the transaction. The first concerns *asset specificity*. Transactions often require investments by both parties that are specific to the contract, and can only be re-deployed elsewhere at significant cost. The advisory fees associated with contract negotiations provide one example of such investments. The second dimension is *uncertainty*, which is likely to be a major problem in PFI contracts because of their long-term character, ownership and financing structures, and risk-sharing features (Dudkin and Välilä 2005). Asset specificity and uncertainty present actors with significant risks in the context of opportunism. In the case of asset specificity, the risk arises from what Williamson refers to as the *fundamental transformation*. Specifically, entering into a contract requires moving from an operating environment in which there is a large number of potential organisations with which to engage, to a more monopolistic setting supported by investments in transaction-specific assets. Therefore, while an actor may have a legal right to exit a contract, it will face costs in doing so – including writing off the investments relating to that transaction and incurring the additional costs of re-entering the market. This may lead to one of the parties persevering with the contract even when the relationship is failing to deliver a positive outcome – a situation described as "hold-up" (Williamson 1985, p.61).

The risks that arise from asset specificity and switching costs may be augmented by those arising from uncertainty. Such risks concern the need for change. If, during the contract, the circumstances surrounding the transaction change, the service specification may need to be amended. From the supplier's perspective, this generates a danger that the purchaser will perceive the change of circumstances as an opportunity to reduce the periodic fee specified in the contract. Conversely, an opportunistic supplier might regard such a change as an opportunity to pass risk back to the purchaser, or raise the contract price, in order to increase its returns. Uncertainty therefore increases the magnitude of the hold-up problem.

Although, in TCE, managers have limited cognitive capacity, this does not mean that they are myopic. Indeed, they are assumed to be capable of "farsighted contracting" – of looking ahead, discerning problems and prospects, and factoring these into the design of the contract (Williamson 1990, p.226). Therefore, while actors are unable to develop complete contracts, foresight allows them to develop broad contractual safeguards. Even in the context of asset specificity and uncertainty, managers will be able to anticipate the risk and ensure that the asset-specific investments are shared or, where that is not practical, ensure that compensatory financial arrangements are posted (Williamson 1985). For example, in a PFI contract, the supplier must invest a substantial amount of internal and external capital in order to construct a unit of public infrastructure. As this renders the party making the investment vulnerable to hold-up, TCE posits that the two parties should restore balance to the relationship by making *credible commitments* (Williamson 1985) – in this case, by the purchaser guaranteeing the supplier a fixed revenue stream over the contract period, contingent on assets and services being delivered to the standards specified in the contract.

It is evident from Chapter 3 that PFI contracts contain a high degree of asset-specificity and uncertainty, for two reasons. First, in an attempt to create an incentive structure that encourages efficiency in long-term operational management (and thus lower whole-life costs than is possible under either conventional public procurement or conventional market governance), many contracts incorporate a bundle of requirements that are managed and coordinated by a single entity – the Special Purpose Vehicle. Second, PFI contracts are often very long in duration, in an attempt to ensure that that the repayment of capital is affordable to the purchaser. In a rapidly-changing industry such as healthcare (see Chapter 1), this will usually mean very high levels of uncertainty, contractual incompleteness and the need for renegotiations during the contract period (Lonsdale 2005). In this context, the TCE framework predicts that the processes of contract negotiation and contract drafting for a PFI deal will be extensive and involve substantial costs for both purchasers and suppliers.[41]

[41] Against this, a number of commentators have argued that the purchaser-supplier relationships generated by the PFI are qualitatively different from those generated by traditional forms of public-private engagement (Grimsey and Lewis 2005). It has been suggested that the normal rules of competitive commercial exchange have, to some extent, been replaced in PFI by rules promoting the common interest. As a result, purchasers have been encouraged to pursue what Macneil (1981) calls a *relational* approach to their PFI suppliers, in which adversarial relations are avoided (Vincent Jones 2006). To the extent that actors are willing to enter into PFI contracts in a spirit of trust, flexibility and willingness to incorporate needed changes in contracts without resorting to opportunism, this mitigates the need for large up-front investments in contract formulation. However, the empirical evidence indicates that such an approach has not been adopted in practice - either by purchasers or suppliers - and that the rules of commercial exchange in a PFI contract approximate those of a conventional principal-agent relationship (Lonsdale and Watson 2007; National Audit Office 2009a; 2010a).

As noted in Chapter 3, a distinctive characteristic of the PFI procurement process is the existence of the preferred bidder stage – a period of exclusive negotiation between a bidder and the public sector purchaser. During this period, there is an absence of competitive tension. *A priori*, we might view this exclusive stage of procurement as a "bilateral monopoly", in which the power of the monopoly seller is balanced by the monopsony power of the buyer such that a mutually advantageous contract can be developed (Williamson 1985). However, as the National Audit Office has noted (2007b), once chosen as a preferred bidder, a private consortium may be in an advantageous negotiating position vis-à-vis the public sector, knowing as they do that they are "virtually guaranteed" to secure the PFI contract (p.21). Lonsdale and Watson (2007), using the TCE approach supplemented with a theory of power, argue that bidders are advantaged in a number of key respects.[42]

One of these is the relative *salience* of the transaction for the parties. Public bodies have to fulfil statutory duties one way or another. If a new hospital is required the public authority would be failing in its duties by not providing it. The preferred bidder, on the other hand, will often face consequences from a breakdown of negotiations that are far less serious. There are also significant political risks to any delay. Whereas customers of private firms are normally able to seek out alternative suppliers if a particular firm has proved unable to deliver an acceptable bid, this option does not normally exist in the case of public services. Any failure of procurement that jeopardises the ability of the public sector to provide services to the public is highly visible, and may have significant

[42] Following Dahl (1964), Lukes (1974) and Emerson (1962), power is defined by these authors as the ability of actor A to make actor B act in a manner that it would not do otherwise. This ability is seen to arise from the possession of superior resources on three fronts: utility (the extent to which the two parties value what each has to offer); scarcity (the extent to which either of the two parties can obtain what they want from elsewhere), and information (the degree to which both parties are informed about aspects of the transaction).

detrimental effects. As a result, avoiding failures in procurement is a high priority for the public sector and this may lead to an overly strong incentive to maintain negotiations with incumbent bidders rather than considering a re-run of the procurement process.

A second factor concerns *switching costs*: that is, the costs of running a new competitive tendering process. In many instances it will be impossible for a public authority to resource, or request from central government, additional funds to commence an entirely new procurement process. This gives rise to hold-up problems, which, as noted, occur when one party to a transaction makes asymmetric investments that are specific to the transaction (in this case, the costs associated with the procurement). There is a risk that the other party will try to renegotiate terms after the investment is made, knowing that the costs of seeking alternative suppliers will be costly. A third factor is *time*. If one party needs certain actions within a relationship to happen urgently, it can also be vulnerable to hold-up practices on the part of bidders. On all three fronts, it is suggested, the bidding firm is in an advantageous negotiating position vis-à-vis the public sector purchaser (Lonsdale and Watson 2007). This asymmetry in power distribution is, they suggest, magnified by the absence of a fundable public alternative to the PFI option (see Chapter 2 of this thesis).

4.4 Competition and excess returns

In measuring the profitability of the market, measures of concentration or assessments of competitiveness provide only a *prediction* of pricing behaviour within the market. As Singer has stated (1968, p.155), such studies can “only be perceived as the beginning and not the end of an analysis of [a firm’s] market power.” Accordingly, this thesis provides an evaluation of the returns projected to be earned by PFI investors alongside the analysis of market concentration, entry/ exit dynamics and competitiveness in procurement auctions. The concept of *excess return* has a specific meaning in financial theory, which is closely linked to the concept of risk. As noted in the previous chapter, risk is conventionally defined as the quantified possibility that *actual values* (costs, revenues and returns) will vary from those *projected* at a given point in time (i.e. at the point that a PFI contract is signed) (Sharpe 1964).[43] Financial economics dictates that it is the degree of risk involved in an investment that determines the rate of return that will be required by investors (Hirshleifer 1958). The "fair" rate of return on an investment (Kay 1976) – henceforth, the *cost of capital* for an investment - is set according to the rate of return earned on the capital market on assets within the same class of risk. In other words, the rate of return required on an investment will be equal to the expected rate of return on alternative investments in the market with an identical or virtually identical risk profile (Grout 1997). The difference between the rate of return on an investment and the cost of capital is the excess return.

To clarify why the cost of capital is the fair rate of return on any given investment, it is instructive to consider the case of a 100% equity-financed firm with spare capital resources (Hillier *et al* 2010). The firm has two options, it can: (i) use the spare capital resources to finance a new investment; or (ii) distribute cash to the firm's shareholders. In the first case, the future cash flows that are expected to be generated by the investment will be redistributed as dividends, and the investment will thereby increase the value of

[43] From the point of view of a risk manager, two dimensions of risk must be considered for every exposure facing the SPV (Hampton 1993). These are: (1). Severity - The degree of damage to the investor that can result from an exposure; and (2) Frequency - The number of times an exposure is likely to become a loss. These core principles are typically operationalised through statistical tools such as Monte Carlo simulation, which allows investors to consider the effect of amending all possible combinations of risk variables (Brealey *et al* 2008).

shareholders' wealth. In the second case, shareholders invest cash in the capital market, buying a financial asset that falls in the same class of risk as the project. It follows that the first option should be undertaken if the return generated by such an investment is greater than the return offered by financial assets falling in the same class of risk as the project itself. Therefore, in order to maximise the market value of the firm, and thus shareholders' wealth, all investments should be undertaken that provide a rate of return *just above* the cost of capital (Hirshleifer 1958). Therefore, the "fair" rate of return on a given investment is the expected return paid by financial assets in the same risk class as that investment.

The academic finance literature on risk is almost wholly about risk in the sense of the probability of actual returns to vary from those projected at the point of that the investment is committed – i.e. the variance of the return around its expected value (Spackman 2001). In Chapter 3, it is shown that the bulk of project-specific risk – relating to both cost and revenue - is borne by subcontractors in a PFI hospital project. While an element of risk is retained by SPV investors, due to the capping of subcontractor liabilities and the cost-plus nature of the lifecycle maintenance subcontract, the probability that *ex post* returns will vary from those projected *ex ante* is low relative to other asset classes. This is significant when considering the returns that are required by equity investors. Since the bulk of project-specific risks are allocated away from the SPV, and thus from investors of blended equity, an SPV should not include a premium for these risks in its expected return.

Indeed, as noted previously, modern finance theory determines that *any* premium for project-specific risks is unwarranted. The small element of project-specific risk borne by SPV investors should on this account attract no additional premium on the required return, since this risk can be spread by its member companies through the diversification of their portfolios, such that overall portfolio returns are not affected (Copeland *et al* 2005; Brealey *et al* 2008; Sharpe 1964; Lintner 1965). On this view, only risks that are systematic, in the sense of being correlated with the market portfolio such that all investments are exposed, require a premium. As Grout (1997) states: "it is the correlation of (or covariance between) returns from the asset with the returns on the overall market portfolio that determines the equilibrium return on an asset. This is the price of risk in a competitive market" (p.59).

This can be clarified by considering the case of an investor with a portfolio in which equal investments have been made in each of *N* investments, such that the relative amount of wealth invested in each of the investments is given by 1/*N*. For simplicity, it is assumed in this case that each of the investments has got the same variance (risk), equal to σ^2 and that the covariance (the correlation of risk between investments) is also the same and equals *C*, where *C* is a positive number. The variance of the return on the portfolio is then equal to:

$$Var(r_p) = \frac{N\sigma^2}{N^2} + (N^2 - N)\frac{C}{N^2}$$

Source: Adapted from Hillier et al (2010)

It is evident that as *N* becomes infinitely large, the variance of each individual investment reduces to zero and thus the expression converges to the value of *C*. That is, the risk on individual investments (project-specific risk) is eliminated and the risk to the return on the portfolio reduces to the systematic risk component common to all investments, which is equal to *C*. Therefore, the cost of capital for an investment is determined by the extent to which its expected returns are correlated with those of the market portfolio (Sharpe 1964).

The Capital Asset Pricing Model of Sharpe (1964) and Lintner (1965) formalises this idea. It states that the opportunity cost of capital (assuming, for simplicity, an all-equity firm) should be calculated by summing the rate of return on a risk-free asset (such as a government-issued "gilt" security) and a premium for the amount of systematic risk, i.e:

$$\overline{r_i} = r_f + \beta_i (r_M - r_f)$$

Source: Adapted from Sharpe (1964)

where $\overline{r_i}$ is the expected return on investment *i*, r_f is the return on a risk-free investment, β_i measures the covariance of returns on investment *i* with those of the market portfolio divided by the variance of the latter, and r_M is the return on the market portfolio. If the expected return on an investment is higher than for other securities with the same β, the expected return is higher than the opportunity cost of capital. Rational investors will buy the security, increasing the demand for it and pushing up the price until it reaches fundamental value, at which point the expected return is convergent again with the cost of capital. Conversely, if the expected return on a security is lower than other securities with the same β, the cost of capital is higher than the expected return and rational investors will not invest in it. The price has to fall, and therefore the rate of return converges with the cost of capital.

The above considers the cost of capital for blended equity, in which risk is defined as the *variance* around the expected return on an investment, or the *covariance* across a portfolio of investments. Considering the appropriate benchmark cost of senior debt, however, requires a different theoretical framework, since, as noted in Chapter 3 (where the degree of credit default risk facing banks involved in PFI projects is presented), returns are modelled not on the basis of expected values but as fixed values. Formally, credit default risk is defined as the possibility that the actual returns on a loan may differ from those the lender expects, with the result that the lender incurs financial losses (Donaldson 1989). Primarily, this is a function of the probability that the borrower may be either unwilling or unable to meet the terms and conditions of the loan agreement and, in a PFI context, is thus related to the risk borne by the *specific* SPV. Part of the way that lenders try to anticipate and manage credit risk is by including a risk premium – a margin in the loan price above their cost of raising funds (e.g. from depositors of wholesale capital markets). In theory, the premium is determined by the historical performance of equivalent loans and is derived as:

$$\frac{(1+i)p}{1-p}$$

where *i* is the cost of raising funds for the lender and *p* is the historical default ratio, both measured as decimal fractions (Koch and MacDonald 2010). For example, a lender with a cost of raising funds of 10% considering making loans in an asset class with a 1% historical default rate would on this basis include a risk premium of ((1 + 0.1) × 0.01 /1 – 0.01 = 1.11%). However, the actual rate of loss on current loans may be at variance with the historical average rate of default, and lenders may additionally consider the variance around this average (modelling, for example, the potential impact on cash flow of the loan performance in particularly bad years or phases of the economic cycle). This means that the lender may be forced to charge an *additional risk premium* to cover the risk that the actual bad debt rate may differ from the expected default rate (Donaldson 1999). Alternatively, the lender may wish to avoid certain types of risky loans altogether if the total risk is seen as excessive. The method by which the lender's cost of funds and risk premium is derived in this thesis draws on the analysis of default risk in Chapter 3 and is presented in Chapter 7.

4.5 Measuring the return

To understand what is meant by the *rate of return*, it is necessary to consider the ways in which capital budgeting decisions are made by firms. Financial theory states that, when considering an investment, a "rational" investor (i.e. a firm that has the objective of maximising its wealth or that of its shareholders) will estimate the amount of the cash it expects to generate from a project on a periodic (e.g. quarterly, bi-annual or annual) basis,[44] and then discount the projected cash flows at the investment's cost of capital. This process provides a *Net Present Value* (NPV) (Hirshleifer 1958). This is the fundamental model within economics of how firms should decide whether to invest in a project (and this is reflected in modern practice as shown below). The NPV represents the *additional* – hence net - value to the investor of the project when compared to other investments available in the market with the same risk status. It is the economic rent, or excess return, offered by the project.

To find the NPV for a sequence of cash-flows a, at period 0; discounted at u, the formula is:

$$\mathrm{NPV} = \sum_{\mathrm{r}=0}^{n} a_{\mathrm{r}} \ (1+u)^{-\mathrm{r}}$$

[44] The *expected value* of a periodic cash-flow is the *ex ante* mean of all possible *ex post* values of that cash flow, weighted by their probability (Brealey *et al* 2008). This approach to risk analysis, which follows Markowitz (1952) is based on the principle that cash flows are uncertain, and this uncertainty must be modelled in terms of a *probability distribution*, which summarises an investor's degree of belief about the likelihood of possible outcomes. This distribution is often based on the past historical performance of investments, modified to reflect the investors' knowledge of the current project or market conditions. On the basis of the probability distribution, the mean value, or *expected value* of costs, revenues and returns can be measured. The risk of the investment is reflected in the *variance*, or dispersion, of the values modelled about their mean value.

The NPV is conventionally regarded as the "gold standard" for investment appraisal in corporate finance theory (Copeland *et al* 2005). For example, Graham and Harvey (2002, p.7) report that 75% of US chief financial officers who responded to the authors' survey "almost always" use the NPV method when making investment decisions. However, this survey also showed that a slightly higher proportion of investors "almost always" use the *Internal Rate of Return*, either in isolation or as a supplementary method to the NPV.

The NPV and the IRR are related concepts. The NPV is positive (i.e. the present value of the projected revenue is higher than the present value of the investment) only if the IRR on the investment is higher than the discount rate (Brealey *et al* 2008). A rational investor will not invest in the project if the NPV is negative. While the NPV and the IRR are the most widely used measures of return used by investors, the IRR is much the most common in the PFI industry and its rate is an important component in setting the unitary charge (Yescombe 2008). As noted by the National Audit Office (2005), the IRR on the projected cash-flows of investors "is the standard measure which the public sector has used to compare the returns expected by shareholders of consortia bidding for PFI contracts" (p.2). The IRR is regarded by the Treasury as "fundamental" to the contractual negotiations (HM Treasury 2007a, p.1).

Mathematically speaking, the IRR is the discount rate that brings the NPV of a stream of cash-flows to zero. It can be seen as the compound interest rate at which an investor's capital would have to be invested in order to generate the same series of cash flows (Cuthbert and Cuthbert 2008). To find the IRR for a project lasting n years, the formula is:

$$\mathrm{NPV} = C_0 + \frac{C_1}{1+\mathrm{IRR}} + \frac{C_2}{(1+\mathrm{IRR})^2} + \cdots + \frac{C_n}{(1+\mathrm{IRR})^n} = 0$$

Thus, in Table 4.1 below, an investment of £1000, produces cash flows of £1,350 over five years. The IRR of this investment is 12.08%. As shown in the NPV column when each of the cash flows is discounted at 12.08% a year the sum of these discounted cash flows is zero.

Table 4.1 Illustrating the relationship between NPV and IRR

End year	Cash flow (£)	NPV @ 12.08%
0	-1000	-1000
1	340	303
2	305	243
3	270	192
4	235	149
5	200	113
Total	**350**	**0**

Despite being ubiquitous usage, the NPV and the IRR are widely acknowledged to have a number of weaknesses (Yescombe 2008; Brealey *et al* 2008; Copeland *et al* 2005). When quoted in isolation, the NPV provides little information about the magnitude of the excess return on a given investment relative to that of alternatives when the investments being compared are of different sizes (Yescombe 2008). A larger project may yield a larger NPV, even if the ratio of the present value of the project's revenue relative to the present value of the investment is lower. The IRR, as a measure of the return as a proportion of the investment, facilitates the comparison of differently-sized projects (Brealey *et al* 2008).

However, the IRR is also acknowledged to have a number of weaknesses. For example, the method is not suitable where a stream of cash-flows flips between negative and positive and back again in different periods (Yescombe 2008). In cases where expenditure (negative cash-flow) takes place in phases, with revenue (positive cash-flow) building up between these phases, the IRR formula will not return a unique result. Specifically, multiple IRRs may be present when interim cash injections exist in future periods, which would lead to the difficulty of choosing the true IRR from the range (Chiang *et al* 2010). In terms of measuring the return on a PFI, a more significant weakness is generated by the opportunity cost assumption within the IRR formula (Copeland *et al* 2005). The calculation of IRR for a stream of cash-flows involves discounting each periodic cash-flow at the IRR. It follows that the opportunity cost of returns foregone in periods of low cash-flow is assumed to be the IRR. While it is reasonable to give some account of the opportunity cost of the foregone returns, the assumption that the correct rate is the IRR is inappropriate. The IRR would be the correct rate only if the IRR was also the cost of capital for the investment (Yescombe 2008).

As indicated above, exploring the relationship between the IRR on PFI investments and the appropriate cost of capital is a key aim of this thesis. For current purposes, it is sufficient to say that if, as is normal, the cost of capital is lower than the IRR on a project, the opportunity cost assumption will undervalue a stream of cash-flows where repayments are deferred. Table 4.2 (overleaf) illustrates the impact of this on an investment of £1000.

In the example, the initial investment is followed by four years of zero cash-flow and a payment of £2011 at the end of year 5. The right hand column shows the effect of the opportunity cost assumption. The amount of debt builds up at the IRR during the period between the initial investment and the final year payment, such that the notional debt is much greater than the initial stake. In column (a), the cash-flow (investment and revenue) is shown. Payment of £2011 does not occur until year 5 of the project, and follows four years of zero cash-flow. During this period, the notional outstanding debt accumulates. Column (b) shows the notional outstanding debt in each year assuming that the opportunity cost of the foregone returns is the IRR. The IRR is equal to the percentage difference between the notional outstanding debt in year 5 and the total value of the revenue payment (15%). Column (c) shows the notional outstanding debt in each year assuming that the opportunity cost of the foregone returns is the cost of capital for the project (assumed to be 10%).

Table 4.2 The IRR and the impact of the opportunity cost assumption: an example

	a	b	c
Year	**Cash-flow**	**Notional debt** ***(outstanding debt + 15%)***	**Notional debt** ***(outstanding debt + 10%)***
0	-1000		
1	0	1000	1000
2	0	1150	1210
3	0	1322.5	1331
4	0	1520.88	1464.1
5	2011	1749.01	1610.51
Net cash-flow	1,011		
Average notional debt		1348.5	1323.1
Percent. difference in total debt/ revenue		**15**	**19.92**
IRR (%)	**15**		

The difference between the notional outstanding debt in year 5 and the total value of the revenue payment is shown to be 19.92% - and this rate might well be regarded as a more accurate measure of return than the IRR of 15%, as calculated by the conventional method.

Cuthbert and Cuthbert (2008) make an analysis similar to the above, and conclude on this basis that IRR is a "highly misleading" measure where returns are "back-ended". They state:

> "If the interest rate on a loan is high, and the lender defers taking interest for a significant period, then the outstanding debt, including accumulated interest, will rapidly escalate. In these circumstances, the total payment to the lender over the life of the loan will be much higher than in the case where outstanding interest is not allowed to accumulate - even though the internal rates of return in the two cases will be the same" (p.6).

Cuthbert and Cuthbert (2008) suggest that the IRR should, as a consequence, not be quoted in isolation, but rather in association with the average notional outstanding debt. Table 4.3 (overleaf) illustrates this point, by comparing two investments. Both investments have an IRR of 15%, but it is evident that Investment A provides a much higher return, and the NPV – calculated on a discount rate of 9%[45] - supports this. The reason for this anomaly is that these investments differ considerably with respect to the extent that the outstanding debt is accumulating. Investment A has a "back-ended" cash-flow profile (typical of a blended equity investment in a PFI), while Investment B has an even profile. By including the average outstanding debt alongside the IRR, the superior return on Investment A becomes clearer.

[45] This result would, in fact, be the same for any discount rate except the IRR. The use of 9% reflects the upper range of discount rates used by investors in PFI accommodation projects, as is further explored in Chapter 3.

Table 4.3 The impact of the opportunity cost assumption on different cash-flow profiles				
Year	**Investment A**		**Investment B**	
	a	b	c	d
	Cash flow	**Notional debt**	**Cash flow**	**Notional debt**
0	-1000		-1000	
1	0	1000	298	1000
2	0	1150	298	879.19
3	0	1322.5	298	736.96
4	0	1520.88	298	569.54
5	2011	1749.01	298	372.46
Net cash-flow	1011		490	
NPV @ 9%	307		159	
Average notional debt (as % of initial investment)		1349 (134%)		711.6 (71%)
IRR (%)	15		15	

Given the problems of both NPV and the IRR, a third measure of return - the *benefit-cost ratio (BCR)* – is advocated by finance theorists (Brealey *et al* 2008). The BCR is the ratio of the present value of the revenue cash-flows to the present value of the initial investment:

$$Benefit\ cost\ ratio = \frac{\text{present value of revenue cash} - \text{flow}}{\text{present value of the investment}}$$

It is evident that this method is closely related to the NPV and the IRR since, if the BCR is higher than 1, the NPV on a project is positive and the IRR is higher than the cost of capital. However, the BCR has an advantage over the NPV in that it provides a measure of return that is referenced against the size of the initial outlay, unlike the NPV, and has an advantage over the IRR in that the formula not contain the problematic assumption that the opportunity cost of capital is equal to the IRR. Below, the result of applying the BCR method to Investments A and B from Table 4.3 (above), assuming a discount rate of 9%, is shown. The BCR ranks Investment A higher than Investment B, like the NPV and unlike the IRR.

As the NPV is the "gold standard" in investment appraisal techniques, the BCR's superior correlation with it in terms of ranking projects by their excess profitability (Brealey et al 2008) indicates that this is a more reliable indicator of the degree of excess return to investors in PFI projects than the comparison between the IRR and the cost of capital.

Table 4.4 Illustrating the Benefit Cost Ratio method

Project	PV of Investment	PV of cash-flow	Benefit-Cost ratio
A	1000	1307.012	1.31
B	1000	1159.116	1.16

4.6 Conclusion

This chapter has attempted to articulate the theoretical rationale for the aims of this study and identify the ways in which the study design has been informed by economic theory and research evidence. At the centre of this approach is the empirically demonstrated relationship between the structure and competitiveness of a market and the rate of return that investors can earn within it. Market structure, incorporating concentration and entry/ exit dynamics is therefore a key focus of this thesis. In addition, as market share in PFI is allocated to investors through a procurement process i.e. competition *for* the market - the features of this process, such as the magnitude of transaction costs, the number of bidders, and the extent of non-competitive bargaining, are an important additional area of study.

In measuring the profitability of the market, measures of concentration or assessments of competitiveness provide only a *prediction* of excess profitability. Such studies should, as Singer has stated (1968, p.155), "be perceived as the beginning and not the end of an analysis of [a firm's] market power." Where markets are concentrated and uncompetitive, the return targeted by firms on an investment will depart from the competitive level of return on that investment – defined as the rate of return that could have been earned on the *next best* alternative investment opportunity with the same risk profile, or the opportunity cost of capital. The difference between the return projected by an investor on an NHS PFI project and its cost of capital in relation to that specific project is the definition of "excess return", used in this thesis, and the principal investigative focus of the research.

The excess return itself is to be measured initially by looking at the spread of IRR over the cost of capital. However, it is acknowledged that the IRR may undervalue a stream of cash-flows where repayments are deferred. Therefore, a second measure of the excess return - the *benefit-cost ratio (BCR)* – is to be used and will provide an additional focus of analysis.

5. The PFI's economic performance: a review of the empirical evidence

5.1 Introduction

The objective of this chapter is to review the economic performance of PFI in terms of its operation in the UK. As stated in Chapter 2, lower public expenditure and debt associated with the use of private finance are artefacts of the government's reporting standards rather than a reflection of economic reality. So long as the private partner has properly constructed and made available the facilities for NHS use, the NHS purchaser must pay the unitary charge. The economic impact of the switch from public to private finance is therefore to alter the timing of payment to the private sector not the amount, which may be greater or smaller depending on the relative efficiency of the approaches (Hellowell 2010). The efficiency of using PFI rather than a publicly financed alternative is therefore a central question facing this policy, and this is what is meant by *economic performance* here.

Economics defines a situation to be efficient if one beneficial activity cannot be increased without decreasing another (Nicholson 1983). Within the broad concept of efficiency, economists distinguish between three main types (Wan et al 2002). *Technical efficiency* requires that the physical or human resources used when producing goods and services are minimised or, conversely, that for a given allocation of physical or human resources the value of goods and services produced are maximised. *Cost efficiency* incorporates the relative costs of resources, and requires that the least-cost combination of inputs is used to produce goods and services or, conversely, that the maximum value of goods and services is produced for a given cost (Hurley 2000). Finally, *allocative efficiency* integrates a consideration of the value of goods and services to different members of society. It asks whether the economy is (a) producing the "right" amount of goods and services and (b) assigning them in accordance with the "value" that individuals place on them (Sussex 2001).

The economic merits of different financing methods can be evaluated against any one or any combination of these types of efficiency. For example, an evaluation of a financing mechanism's allocative efficiency may seek to address whether it achieves the societally preferred balance and type of the goods or services better than the alternatives (Sussex 2001). In an activity such as health care with "merit good" characteristics (such that the social value of care exceeds its private value) quantity and quality are also important concerns (Hellowell and Pollock 2010b). A loss in social welfare could arise if providing health care facilities through one mechanism rather than another compromises the quantity or quality of supply and moves the economy away from its welfare optimum (Reiss 2005).

The focus of performance evaluation in this chapter, however, is cost efficiency and in particular whether the use of PFI has minimised the financial resources used in delivering the capital and service outputs required by the NHS purchaser in comparison with a publicly financed alternative. For private finance to represent a cost efficient mechanism in these terms, it must provide savings and/ or quality improvements – in terms of better risk allocation, greater cost certainty, a focus on whole-life costing and longer-term performance management – sufficient to offset the higher return on private finance relative to that available if the government were to borrow on its own account (Hellowell 2010).

Whether PFI can achieve this involves consideration of the PFI model's *financial* and *operational* costs, and the empirical literature on these is the focus of this chapter. The answer has significant implications for the interpretation of the findings on market structure, competitiveness and investor returns presented in Chapters 7 and 8. If it is the case that the operational elements of projects are likely to cost less under a PFI compared with a publicly financed alternative, then even if the cost of private finance is higher, this may be a price worth paying to secure a project that is more cost efficient overall. If, on the other hand, the operational elements of the PFI model are likely to cost the same, or more, in comparison with a publicly financed alternative, then a higher cost of finance represents a clear economic loss to the NHS purchaser. In this context, it is especially important that the cost of finance should be minimised – for any element of excess return to investors constitutes an additional burden on the purchaser's revenue and capital budgets, thereby eroding the sustainability of the NHS and its ability to meet population health care needs.

This chapter is organised as follows. In section 5.2, the framework for the review of the literature is described and explained. In section 5.3 the methodology for the review is outlined. The review is presented in section 5.4, and section 5.5 concludes the chapter.

5.2 The claimed benefits of private finance in project delivery

This section examines the main arguments used by the UK government and other interested parties to support the claim that the use of private finance will result in greater cost efficiency than a publicly financed alternative. It is shown that the case for PFI rests on the view that the inclusion of private finance results in the generation of incentives which lead to greater due diligence, better construction management and longer-term cost planning.

5.21 Risk, reward and the incentive structure facing providers of capital

A key principle behind the PFI is that it allocates project-related risks to the parties best able to understand, control and minimise them (HM Treasury 2000). Where a firm bears a risk, it has an incentive to manage it and take steps to avoid any adverse impact from it. The Treasury carried out an internal review of the cost-efficiency of the PFI, which was accessed by the author under a Freedom of Information request (HM Treasury 2010d). This review describes the benefits of the PFI capital structure in terms of risk allocation, incentives and performance, and identifies the different contributions of equity and debt finance (see Table 5.1 overleaf). Equity is seen to act as an integrator and manager of construction/ operational risks – tasks it should be incentivised to deliver efficiently as its own projected cash flow is at risk in cases of sustained failure. The role of debt is seen as regulatory – assessing the robustness of project planning before and after financial close, and, *in extremis*, stepping in to manage problems. The case for PFI therefore resides in the model's ability to allocate risks more effectively than a publicly financed alternative, and ensure the public sector gains from any resulting reduction in costs (National Audit Office 2009a).[46]

[46] As noted in Chapter 3, the standardisation of PFI contracts by the Treasury (HM Treasury 2009) has meant that a particular risk-allocation structure is common to the vast majority of PFI projects undertaken in the UK

Table 5.1 Theoretical benefits of the PFI capital structure		
	Construction	Operations
Debt	Provider of finance	
	Discipline in risk analysis/allocation	Discipline in risk analysis/allocation
	Due diligence (upfront)	Due diligence (ongoing maintenance)
	Early warning sign for failing projects	Early warning sign for failing projects
	(Step-in)/sort out failing projects	(Step-in)/sort out failing projects
	Monitor and provide discipline on equity	Monitor and provide discipline on equity
Equity	Provider of finance	
	Integration of design and build	Integration of design, build and operate
	Management of construction risk	Long-term performance management
	Dealing with emerging problems on failing projects	Dealing with emerging problems
	Losses when projects fail	Losses when projects fail

Source: HM Treasury 2010d

5.22 The cost of private finance

While the above table outlines the Treasury's view of the *benefits* of equity and debt finance in public procurement, it does not contain data on the Treasury's view of the *costs* of private finance. However, previously published material (HM Treasury 2003b) provides a detailed outline of the Treasury's view on this issue. These make clear the Treasury's view that investors are able to earn only a normal return on their investments. In explaining this view, a high degree of competitiveness in the markets for equity and debt capital is assumed:

> "A great part of the difference between the cost of public and private finance is caused by a different approach to evaluating risk. Typically, the private sector takes account of risk by discounting future cash

> flow at a higher rate. A risk premium is therefore made explicit in the private sector cost of capital, and the level of return on capital is competitively determined according to the risks assessed in the project" (HM Treasury 2003b, p.41-42).

It is evident that this view will mislead where markets are uncompetitive. In that case, the cost of finance on an investment will reflect not just risk, but the ability of an investor to use its market power to extract an additional premium. As noted in Chapter 1 of this thesis, there are *a priori* reasons why we might predict a limited degree of competition in the PFI market. Firms capable of winning PFI bids require strong balance sheets to persuade public authorities that they are capable of bearing and managing the risks associated with asset construction, long-term maintenance and services, which may lead to a concentrated market dominated by a limited number of firms. In this context, the scale of the NHS PFI programme may have placed significant constraints on the supply capacity of the industry.

5.23 Reducing cost and time overruns

As discussed in Chapter 3, the PFI contractual model involves separate fixed-price contracts for construction, maintenance and services in which financial penalties can be imposed on subcontractors where these fail to meet contracted standards. In some cases, construction delays, cost-overruns, or sustained under-performance in service delivery may impact on the return to SPV investors (and *in extremis* threaten the viability of the project as a whole, raising the possibility of a senior debt default). In principle, this confers on the SPV a strong incentive to deliver the contracted assets on time and within the projected budget.

5.24 A “whole-life” approach to construction and maintenance

The bundling of construction and the operational components of infrastructure contracts is generally regarded by economists as sensible in cases where the desired outcomes can be adequately specified and monitored (Schleifer 1998, Grossman and Hart 1986, Hart 2003).

In a PFI project, the SPV is responsible for both the construction and operation of the asset, and the cost of both is included in a single price provided to the public sector client. Thus, the SPV may have an incentive to spend more on construction if it means spending less on maintenance, which would result in a lower cost overall (Välillä 2005). In other words, bundling of phases encourages up-front investment that will contribute to cost reduction over the asset’s life cycle. Assuming competitive contracting, this may reduce the overall cost to the public sector through lower bid prices. In contrast, if two separate firms undertake the construction and operation phases, economic theory predicts that such investments will *not* be made in the construction phase and thus the overall cost may be higher. Expanding the scope of this bundle to include finance theoretically sharpens this incentive since the value of the project to the SPV membership is determined by the expected performance of the project over its whole life. The UK Treasury (2003b) states:

> “This incentive to create a public asset with long-term value enables construction contractors to take a long-term interest in the project, even after they have completed their construction task. This also enables the various contractors to the PFI project and investors to work together with a common interest in creating an optimum, whole-of-life, cost-effective project and provides the right incentives to seek the best performance in the form of the performance regime set out in the PFI contract and actively remedy deficiencies” (p.35).

One specific prediction of this reasoning is that building design will make use of innovations in order to provide higher quality, thereby reducing project costs over the whole life-cycle.

5.25 Long-term performance management

To the limited extent that investors are exposed to project-specific risks (see Chapter 3), this provides incentives to perform effectively and can in principle help to ensure that service delivery meets the standards specified in contracts. Performance management regimes that tie payments to performance are not unique to private finance, and are a familiar feature of major service contracts. However, it may be argued that the potential for poor performance to impact on the rate of return to the SPV sharpens the incentive to perform cost efficiently.

As noted above, for private finance to deliver better cost efficiency than a publicly financed alternative, the benefits it delivers – in terms of better risk allocation, greater cost certainty, superior whole-life costing and longer-term performance management - must outweigh the higher costs. Given the bundle of tasks involved in a PFI project, the key evaluative question facing PFI is, therefore, whether the private finance capital structure can deliver cost-savings or benefits in respect of (1) *design and build*, (2) *maintenance* and (3) *service provision* (either independently or in combination) that are sufficient to offset the cost of paying returns to equity and debt. This sets the framework for the review of the literature below.

5.3 Methodology

5.31 The search

This literature review incorporates peer-reviewed articles and selected categories of grey literature as shown in Table 5.2 (overleaf). The literature was obtained from a variety of sources. Online bibliographic databases were the primary sources for peer-reviewed literature. Also included were reviews of reference lists from papers obtained in the database search. Through this, relevant literature published by PFI practitioners (particularly professional advisory firms) was identified. Due to the size and political salience of private finance in the NHS, a number of different organisations, including government departments and official audit bodies, have also produced evaluative literature. Relevant reports and briefings from these sources were identified through searches on the relevant websites.

Table 5.2 Academic databases and websites used in the literature search

Academic databases	Websites
ASSIA	IPPR
Business Resource Premier	Department of Health
Econlit	European Investment Bank
IBBS/ Global Health	EPEC
IEEE (engineering proceedings)	HM Treasury
International Journal of Project Management	UK Parliament archives (Hansard)
JSTOR	National Audit Office
ProQuest	Audit Scotland
Web of Knowledge	Scottish Government
Google Scholar	World Bank
PubMed	EU Observatory on Health Systems and Health Policy
Web of Science	International Monetary Fund

As shown in Table 5.2, 24 core sources (12 literature databases and 12 websites) were searched, using the search terms listed overleaf. Given the inter-disciplinary nature of research in this policy area, it was necessary to consider databases covering a broad range of disciplinary areas, including health policy, economics, engineering, accountancy and corporate finance. The websites searched included those of think tanks, supranational (global and European) institutions, government departments and official audit bodies. All those listed are important actors in the PFI process and contributors to public discussion.

5.32 Search terms

Search terms were kept broad in order to maximise yield. It was predicted that, while articles relating specifically to health care would be likely to provide the most relevant data, multi-sectoral studies or research focused on other parts of the public sector might add to the comprehensiveness of the review. In addition, it was decided that while articles relating to the UK PFI were most likely to provide the core evaluative focus international literature could potentially add valuable insights. Therefore, search terms were set so as to generate, in the first stage search, a stock of literature that was both multi-sectoral and international.

The search terms used were:

- private finance initiative
- PFI
- public private partnership
- PPP
- project finance
- private finance
- P3
- private participation in infrastructure
- PPII
- Risk

The search terms were used in a variety of search fields, such as title, keywords, abstracts and Mesh terms and were combined in various ways. During the first stage search, search terms were combined using Boolean searching and were refined using limiting tools with combinations of the search terms.

5.33 Exclusion/inclusion criteria and process

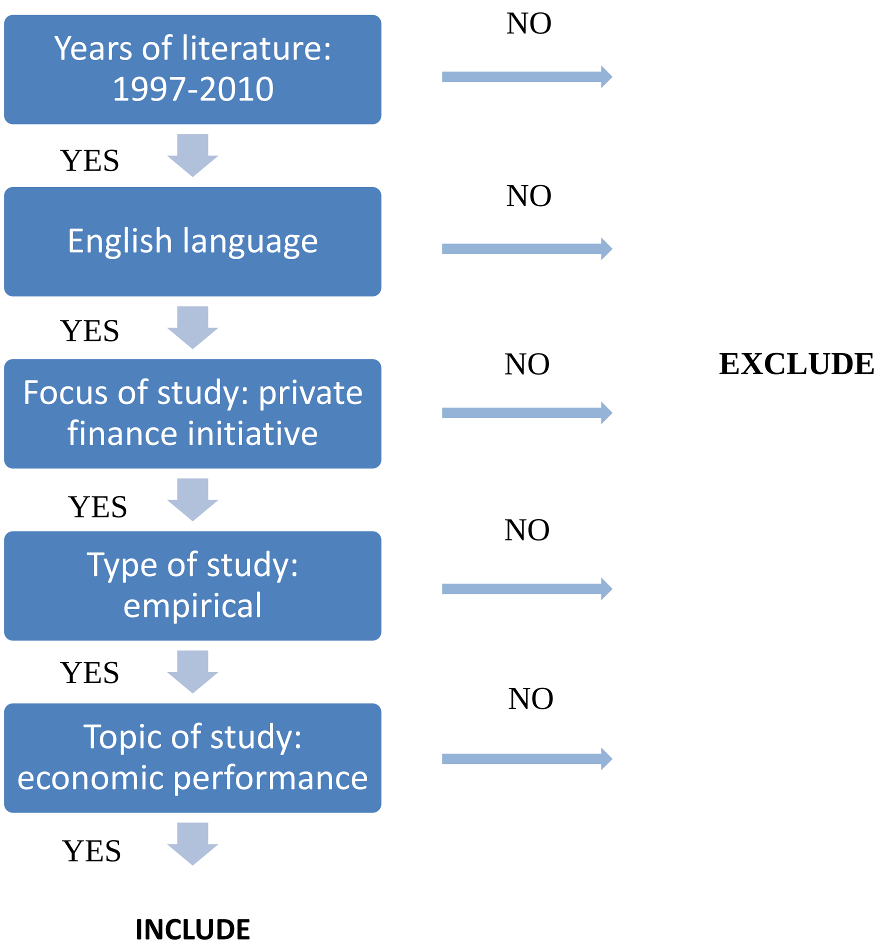
This review is focused on empirical research on the economic performance of the PFI model (or some aspect of that performance). As noted, the review is not restricted to the health sector, nor has international evidence been excluded. Being focused on empirical research, the review is restricted to material published after 1997 since no PFI project in the hospital sector had reached financial close until this date. The search was conducted in June 2010.

The initial search yielded 5033 hits including duplicates. A first sift of this eliminated all literature which could immediately be identified as irrelevant by the title. This reduced the list to 689 hits. A second sift eliminated all items which did not fulfil any of the inclusion criteria by studying the abstracts and, if in doubt, skim-reading the content. This yielded 112 items. Where full papers were not available, attempts were made to obtain as many as possible through the National Library of Scotland. Since this chapter is concerned with empirical evidence, the main criterion for inclusion in the review was that articles should be based on empirical data. Therefore, the third and final sift eliminated those articles which were not focused on the evaluation of private finance in terms of its economic performance (as opposed to other public interest concerns). Short commentaries, editorials and analyses that did not contain empirical data were excluded. This yielded a final data set of 56 items.

Table 5.3. Database and website search hits and the sifting process				
Database/website	**Initial yield**	**Sift 1**	**Sift 2**	**Sift 3***
ASSIA	60	9	3	-
Business Resource Premier	660	24	21	-
Econlit	180	17	8	-
IBBS/ Global Health	77	21	13	-
IEEE	124	7	2	-
IJPM	18	7	1	-
JSTOR	113	5	6	-
ProQuest	19	5	0	-
Web of Knowledge	112	5	6	-
Google Scholar	3380	488	0	-
PubMed	67	21	8	-
Web of Science	122	15	7	-
IPPR	3	1	1	-
Department of Health	0	0	0	-
European Investment Bank	1	0	0	-
EPEC	0	0	0	-
HM Treasury	3	3	3	-
UK Parliament archives	12	4	4	-
National Audit Office	74	54	24	-
Audit Scotland	2	2	2	-
Scottish Government	1	1	1	-
World Bank	1	0	0	-
EU Observatory on Health Systems	3	0	0	-
International Monetary Fund	1	0	0	-
TOTALS	5033	689	112	56

** Database source was no longer identifiable at this stage.*

Figure 5.1 Algorithm for inclusion of studies identified by bibliographical databases and internet searches



As noted, the literature search was complemented by examination of citations within the articles identified as above. This checking for cross-references by and large confirmed that most relevant studies had been identified by the literature search. However, a number of grey literature sources were identified, particularly in respect of reports from the corporate sector. Once final exclusions had been made, the final list of 61 studies was reviewed.

5.4 Results of the literature review

5.41 The return to private investors

Describing the price of private finance - in terms of the projected or actual rate of return to investors in PFI projects - has been an important focus of both academic research and official audit (e.g. Edwards *et al* 2004; Broadbent and Laughlin 2005; National Audit Office 2005a). However, the relationship between returns to PFI projects investors and the risks they bear has not been convincingly assessed. This lacuna exists despite broad acknowledgement of the importance of the issue. For example, the House of Commons Public Accounts Committee identified the relationship between returns and the risk investors bear as a priority for future research (2003, 2011). In terms of scholarship, the scope for evaluative research has been limited by the absence of publicly available data.

Relevant information has also been withheld from official and parliamentary auditing bodies, including the National Audit Office and the Commons Public Accounts Committee. In 2003, a Committee report stated: “We have sought on a number of occasions to gain an understanding of the relationship between the returns which [investors] earn from PFI projects and the risks they actually bear. At present the available information is limited and mixed.” (Public Accounts Committee 2003, p.7). In a recent report, the committee noted: “There is little information on the returns made by primary and secondary investors on their PFI investments, making it impossible for the public sector, Parliament and the public to assess whether the investors’ returns are reasonable for the risks they bear” (2011, p.9).

There is a body of literature which examines the impact of PFI revenue costs (actual or projected) on health care budgets and capacity. This has demonstrated that PFI projects are associated with NHS plans to reduce the scope of acute care services, both pre-contractually and post-contractually. The specification of PFI assets has typically been premised on projections of lower growth in local demand for acute care, larger reductions in lengths of stay and higher levels of bed-occupancy than national trends would imply (Gaffney *et al* 1999; Price and Green 2000; Sussex 2001). There is also evidence that NHS organisations with operational PFI hospitals have higher-than-average capital costs, and attempts to offset this have been focused on further reductions to inputs such as in-patient beds and non-clinical staff (Shaoul *et al* 2008; Hellowell and Pollock 2009; Hellowell and Pollock 2010). The evidence is consistent with the conclusion that the clinical capacity of NHS hospitals is restricted, relative to what would be possible under a publicly financed project, to enable the NHS to provide investors with their required return and thus meet the higher capital costs inherent to the PFI contractual model (Sussex 2001). This is certainly the interpretation that some authors have drawn from their findings (e.g. Gaffney *et al* 1999; Price and Green 2000; Shaoul *et al* 2008). In a representative passage, Gaffney *et al* (1999) argue that:

> "The private finance initiative substantially increases the cost of hospital building. Total costs (construction costs plus financing costs) in a sample of hospitals built under PFI are 18-60% higher than construction costs alone. Shareholders in PFI schemes can expect real returns of 15-25% a year. The consortiums involved in these schemes charge the NHS fees equivalent to 11.2-18.5% of construction costs. If the Treasury were to finance new hospitals directly out of its own borrowing it would pay a real rate of annual interest of 3.0-3.5%. It has been estimated that the £2.7 billion Scottish private finance initiative programme will cost, at a conservative estimate, "£2 billion more than if the Treasury

had acquired the assets directly." The higher costs will be met locally through cuts in clinical spending" (p.116).

However, the evidence is not conclusive and different interpretations are possible. In particular, it may be that NHS organisations have not been funded by central government sufficiently to undertake substantial new hospital developments and meet the higher revenue payments that they create. If this is the case, it may be that large new hospitals - however procured - would create affordability problems. Because of the overwhelming dominance of PFI in the development of NHS hospital-building programmes since the mid-1990s (Hellowell and Pollock 2009), it is difficult to eliminate the possibility that the financial problems observed are caused by under-funding for capital, however capital is sourced.

As noted in Chapter 3 (footnote 15), for an NHS organisation without an operational PFI hospital, capital is not a free good. Rather, capital costs are the sum of depreciation of fixed assets and the dividend on public dividend capital, or PDC. The PDC is a payment made by the NHS organisation to the Treasury, which is currently 3.5% of current asset value (down from 6% between 1991 and 2003). Every one pound fall in the valuation of the assets through depreciation means that the absolute value of this PDC charge is reduced. This means that the capital charge for an NHS organisation accommodated in older facilities will be lower, all else being equal, than that of an NHS organisations accommodated in newer facilities. Therefore, it is possible that the ratio of capital charges/total income at NHS hospitals with PFI projects will be higher than average *for this reason*, rather than because of high investor returns (though, of course, any excessive returns will magnify this impact).

At an early stage of the development of the PFI programme, the consultancy Arthur Andersen and the University-linked consultancy Enterprise LSE were commissioned by the Treasury to examine the value for money of a sample of PFI schemes that had reached the operational stage. In this report, it was stated that the cost of private finance was "1 to 3 percentage points higher than public sector borrowing as measured by current [UK government] gilt rates" (Arthur Andersen and Enterprise LSE, 2000, p.4). Since the report's publication, the 1-3% range cited has been used by many advocates of PFI to promote the policy. It was, for example, used by the Treasury as evidence that the interest rate differential between public and private finance is not significant (HM Treasury 2000) – i.e. is at a level that might credibly be offset by savings in asset construction and operations.

However, this statement, contained in the Executive Summary of the Arthur Andersen-LSE Enterprise report, is inconsistent with the document's main text, which states that this differential applies specifically to the senior debt finance costs, and not the overall financing cost. The main text acknowledges that "higher returns will be demanded for junior debt [i.e. loan stock] and equity finance [i.e. share capital]" (p.9). Given the absence of any supporting data in the report, it is not possible to say whether this discrepancy resulted from an error, or if the report's authors had found that senior debt costs and overall finance costs were in fact equal. However, the latter possibility is unlikely, given that, as the authors of the report acknowledge, the return on loan stock and equity will be greater than that on senior debt.

In a succession of reports (incorporating both case studies and cross-sectoral analyses), the National Audit Office has provided descriptive statistics relating to the rate of return earned by SPV shareholders on their investments (mostly, the IRR on blended equity). It should be noted that none of these studies has described the rate of return on the *overall* financing package (i.e. the IRR on the project).[47] A prominent focus of these reports has been the difference between the blended equity IRR projected at the point of financial close and that projected after the process of refinancing (see Chapter 2). In many cases, these increases have been very substantial. On the Norfolk and Norwich University Hospital Trust's PFI contract, the projected blended equity IRR increased from 18.9% at financial close to 60.4% (National Audit Office 2005a). In a separate study, the blended equity IRR on the Dartford and Gravesham NHS Trust's PFI was shown to be 21% at close, rising to 56% after refinancing (National Audit Office 2005a). The equivalent figures on the Bromley Healthcare NHS Trust's PFI project are recorded as 21% and 70.5% in an appendix to a multi-project study on refinancing (National Audit Office 2006). Although the audit body has acknowledged that the IRR is not a reliable indicator of the future rate of annual returns (National Audit Office 2005a), it has not sought to supplement the description of returns using other financial ratios, for example Net Present Values or Benefit-Cost Ratios.[48]

As a consequence, perhaps, debate on this issue has focused on the *process of refinancing itself* as somehow damaging to the cost efficiency performance of PFI (Public Accounts Committee 2007), rather than the arguably more important issues of: (i) the information the refinancing process elicits in terms of the level of investor returns, and relatedly (ii) the accuracy of the IRR measure as the standard by which the public sector (and the wider public debate) has considered the returns expected by investors bidding for PFI contracts. Specifically, if it is the case that blended equity investors are able systematically to increase their projected IRRs through the process of refinancing, this is a strong indication that the

[47] The IRR measure used in assessing the return to all investor types ("Project IRR") is outlined in Chapter 7.
[48] The impact on refinancing on cash-flows and the source of the increase in IRR is discussed in Appendix C.

investor returns agreed at the point of financial are too high. However, a comprehensive assessment of this issue should consider the reliability of IRR in the context of cash-flow profiles that are "back-ended" before a refinancing and "front-ended" after a refinancing.[49]

A different approach to measuring investor returns is recorded in Hellowell (2011a), which examines the cash-flows projected to accrue to project investors on the Royal Liverpool and Broadgreen University Hospital NHS Trust PFI project. The analysis centres on the projected Free Cash Flow to the Project, defined here as the total annual income to the PFI partner minus the annual costs incurred by it (capital expenditure, maintenance expenditure, services expenditure, lifecycle costs and transaction costs). The additional cost of private finance is derived by discounting this stream of projected cash-flows at the gilt rate of 4.2%. This produced a Net Present Value of £175 million, which is identified as the additional financial cost of using private, rather than public finance, to deliver the £244 million project:

> "The government could have spent £175 million less, in NPV terms, by borrowing directly from the capital markets, rather than through an SPV intermediary. This is the additional cost of private finance that the PFI model needs to offset, in terms of efficiencies in construction, maintenance and/or services compared with conventional procurement, if it is to represent a cost-efficient solution." (p.17)

An alternative analysis is suggested in which both the expenditure and revenue cash flows are discounted at 4.2%, and then the present value of each is compared. On this basis, the present value of the revenue cash-flow was found to be £421 million and the present value of the expenditure cash-flow £246 million, a ratio of 1.7/1. The paper notes that, with

[49] The problematic nature of the IRR in the context of unstable cash-flow profiles is discussed in Chapter 3 of this thesis. The impact this has on IRR pre- and post- refinancing is illustrated in a case study in Appendix C.

financing provided at the gilt rate, rather than at the projected private finance rate, the ratio would be 1/1. This analysis is used to highlight the fact that opportunities for capital investment are foregone when cost-inefficient financing sources are chosen. It concludes: "Assuming that PFI does not deliver efficiencies in construction, maintenance and/or services then, for the same present value of finance-related payments, the UK government could have secured 71% more investment by borrowing on its own account" (p. 17).

While the above analysis indicates that the cost of private finance on this project is high, relative to the cost of direct government borrowing, it does not examine whether, or the extent to which, the rates of return projected are in excess of the fair level. As no premium for risk is included in the chosen discount rate (which is set equal to the risk-free gilt rate),[50] the study does not relate the returns projected against the risks being borne by investors.

Shaoul *et al* (2008) is the first study to record the *actual* returns accruing to PFI project investors. It examines the company accounts of individual SPVs on the first 12 PFI hospitals to reach financial close in England, and calculates an overall cost of finance (post-SPV tax) of 8% in the first few years of project operations. The authors compared this to the government gilt rate (which they suggested would be 4.5% for the relevant period) and estimated the additional cost of private finance for these 12 schemes at £60 million a year.

That is, a private sector rate of return was related to the risk-free rate, and the difference between the two described as an extra cost to the public sector. As with Hellowell (2011a), no attempt is made to examine the relationship between the return and the risks being

[50] The characterisation of the government gilt rate as a "risk free" rate is explained in Chapter 6 of this thesis.

borne.[51] Indeed the authors argue that the cost differential between public and private finance is "attributable to the cost of risk borne by the project companies" (p.107). A second possible objection to this analysis is that, as Chapter 6 of this thesis illustrates, the cash flow to SPV investors (i.e. blended equity) can fluctuate significantly from year to year, and is concentrated towards the front or back end of the contract period (depending on whether a refinancing has taken place). Therefore, significant caution needs to be exercised when extrapolating rates of return for an SPV from outturn profit margins over a limited period.

PricewaterhouseCoopers and Franks (2002) provide an evaluation of projected returns to investors on a sample of 64 PFI projects drawn from across the public sector. The study attempts to compare IRRs on Free Cash Flow to the Project (Project IRRs) with project-specific cost of capital benchmarks (see Chapter 3). To provide these benchmarks, a reference cost of blended equity was calculated using the Capital Asset Pricing Model (described in detail in section 4.4),[52] with risk premiums (β) set on the basis of returns data drawn from UK water and gas utility companies. Other figures used to calculate the benchmark cost of capital for each project[53] were the average financial 'gearing' of the project (i.e. the relative contribution of debt and equity to the project company over the contract) and the actual rate of return on senior debt for each project within the sample.

On average, the "spread" between the Project IRRs and cost of capital benchmarks was 2.4%. From a policy perspective, this finding could be seen as very significant. Assuming that

[51] It could also be argued that the risk-free rates used were lower than appropriate, since the long-dated gilt rate would have been higher during the periods in which the projects being studied reached financial close.
[52] In brief, the Capital Asset Pricing Model hypothesises that equity investors demand a premium above the risk-free rate of interest to compensate them for bearing risk. The premium is a function of systematic risk.
[53] See Chapter 6 for a discussion of the Weighted Average Cost of Capital and its application to the PFI model.

the project-specific cost of capital benchmarks are accurate, this study (which was commissioned by the now-defunct Office of Government Commerce) shows that the cost of private finance is significantly higher than can be rationalised by the amount of risk being borne by investors, contrary to the Treasury's stated view on this issue (as outlined earlier in this thesis). However, the study's comparison of Project IRR with cost of capital benchmarks may underestimate the scale of the excess return inaccurately for three main reasons.

First, while a reference cost of blended equity was constructed and fed into the cost of capital benchmark, the reference cost of debt for each project was taken directly from the related financial model – in other words, the actual interest rate on debt for the project was used - and there is therefore no attempt to assess the 'reasonableness' of this rate. Had a benchmark cost of debt been used (e.g. constructed on the basis of an appropriate base rate plus a premium for the amount of risk being borne by debt providers, as outlined in Chapter 5), it is likely that the WACC benchmarks would have been quite different to those reported, increasing or decreasing the reported spread between the IRRs and WACCs.

Second, the study utilises only one measure of return (the IRR), despite the potential unreliability of this measure when applied to investments with an irregular profile of cash flow (see Chapter 3). The use of additional measures, such as the Benefit Cost Ratio (BCR) discussed previously, would have helped to identify any possible distortions associated with the IRR formula. Third, as there is no project-specific data recorded in the report (neither individual IRRs nor individual cost of capital benchmarks are recorded, ostensibly due to commercial confidentiality restrictions), it is impossible to determine whether the size of the spread varies between projects with different risk characteristics (e.g. availability payments versus usage-payments) and/ or in different sectors. From the perspective of the health system, it is particularly important to determine whether the average cross-sectoral spread of 2.4% recorded in the paper is representative of spreads on NHS projects specifically.

In the report's evaluation of blended equity returns, the benchmark cost of equity is constructed on the basis of a risk premium referenced to historical returns recorded by UK regulated utilities – specifically, those businesses subject to RPI−X regulation. With large initial capital investments, low-to-negligible demand risk, relatively predictable costs and long-term planning horizons, regulated utilities are subject to a risk structure not dissimilar to that borne by SPV shareholders. However, the long duration of PFI serves to limit *regulatory risk* – the possibility that the regulatory regime will change within the period over which investments are amortised, leading to changes in expected costs and revenues. In contrast, in regulated utilities, regulators only adopt a five-year time horizon, and will generally seek to restrict prices at these junctures. The "time inconsistency problem" generated by uncertainty about future regulation is considered to be one of the main risks borne by regulated firms and a major driver of the sector's high cost of capital (Helm 2009).

In addition, the focus on historical returns data from businesses subject to RPI−X regulation, as distinct from other regulatory regimes, is also open to question. Under RPI−X, the expected revenues of firms are capped at the rate of inflation minus expected efficiency X, where X is the efficiency of other firms in the market. Allowed revenues are set on a basis of projected costs and revenues for a period of five years. As PFI unitary charges are adjusted through benchmarking or market-testing at intervals of five to seven years (National Audit Office 1007b), this may generate a risk structure similar to RPI−X. However, rate of return regulation might be regarded as more representative of the level of risk faced by a PFI investor. Under this regime, firms inform the regulator annually of expected costs that will be incurred in different sections of the business and an allowed rate of return is determined on this basis each year. This resembles the PFI regime in which the greater part of systematic risk is retained by the public sector or hedged through derivatives, while the bulk of project-specific risk is shifted from investors to subcontractors, such that cash flow to investors is either fixed or determinable by reference to the contract (see section 3.5).

5.42 Design and build

(i) Delivery to time and price

As discussed in Chapter 3, PFI construction contracts operate on a fixed-price basis, and contractors are subject to financial penalties if they fail to deliver on time. In cases of sustained underperformance, delays or cost-overruns may impact on the returns to investors. As a result, there are reasons *a priori* to hypothesise that a privately financed project will provide relatively good outcomes in terms of delivering the construction works to time and to budget. There is empirical evidence to suggest that this is indeed the case.

The National Audit Office (2009b) published a survey of PFI projects from across the public sector for the period 2003-2008. It found that in 69% of the projects within the group, construction works were delivered within a month of the due date. Only 18% were delivered over six months late, the latest being 36 months late. Of the projects experiencing delays, less than half experienced increases in price that were passed on to the public sector in the form of higher unitary charges. In addition, the majority of price increases were due to changes requested by public sector clients during construction, though 10% of projects experienced price increases without any changes to the specification of the building. In contrast, a previous report by the National Audit Office (2003) found that 70% of publicly financed constructions were delivered late, and a more recent report (National Audit Office 2005b) found that 55% of a group of public sector projects were delivered on budget - though the average level of overspend decreased from 6.5% to 4.1% over the study period.

Recently, the Treasury has stated that the “construction performance gap” between PFI and conventional procurement “may be closing as the latter improves” (HM Treasury 2010d, p.7). However, it should be noted that comparing PFI and non-PFI projects for post-contractual price increases relating to construction is not, in itself, a valid method for testing cost efficiency. The contract price in a publicly financed procurement is agreed at a much less advanced stage of project design and specification than pertains at financial close in a PFI procurement (Hellowell and Pollock 2010). The notion of contract price in PFI has risk control mechanisms built into it that are often absent in publicly financed procurement, and these are priced and factored into the unitary charge before financial close (frequently in a context of non-competitive as discussed in Chapter 8). Therefore, proposing that post-contractual price certainty can be taken as an arbiter of overall cost efficiency would be to set up a comparison which is certain to favour PFI. It is evident that a project that is delivered to time and to budget (in post-contractual terms) may represent very poor value for money if the price paid for the risk transfer that led to that outcome was too high.

In 2002, the Treasury commissioned the technical consultancy Mott McDonald to compare the cost and time performance of PFI against that of publicly financed procurement. The resulting report (Mott MacDonald 2002), aimed to gather representative samples of PFI and contemporary publicly financed projects. However, the study does not include an account of the sampling methodology used, and does not comment on the representativeness of the samples studied. Although 80 projects were initially selected for inclusion in the study, ultimately the PFI sample included just 11 projects and 39 comparator schemes. According to Pollock and Price (2007), the methodology adopted is subject to selection bias, in that the comparator sample included projects commissioned under different conditions, and different time periods, with some projects predating the introduction of PFI by more than two decades.[54] These authors also suggest that non-standard schemes are over-represented in the comparator sample and under-represented in the PFI sample. Seven of the 11 PFI projects were standard projects, compared with only 17 of 39 projects in the publicly financed sample. The PFI sample also excluded all of the numerous failed PFI IT projects, such as those for National Insurance Recording System 2 (NIRS2) and the Passport Office.

Pollock and Price (2007) also point to sources of measurement bias in the study. Most importantly, cost changes were measured from different baselines under PFI and under conventional procurement. Cost change in PFI projects was measured from the FBC stage to completion, whereas cost change in public procurement was measured from a far earlier stage of project planning. Consequently, cost escalations included in the publicly financed sample were excluded from the PFI sample, with the effect that cost changes under the former were inflated relative to the latter PFI. In the Mott MacDonald report, it is stated that the use of different baselines for measuring cost changes was due to an absence of data. Thus, this critical source of measurement bias was acknowledged but not addressed.

[54] Because of the dominance of PFI in large-scale public investment since 1997, constructing an appropriate sample of publicly financed projects with which to compare the performance of PFI is inevitably challenging.

Finally, the experience of PFI in the NHS has not been as positive in terms of delivery to time and price as the audit data would indicate – at least insofar as this can be measured by the unitary charges paid by NHS organisations. Shaoul *et al* (2008) examined the unitary charges for the first 12 PFI acute hospital projects in England. They found major differences between the unitary charges outlined in *Full Business Cases* (see Chapter 3), and the unitary charges actually paid by the NHS organisations involved from the point of the contracts becoming operational. In total, 10 out of the 12 organisations were paying more than had been outlined in the Full Business Cases. In some cases, these increases were very substantial.

In 2005, seven organisations were paying over 10% more than was outlined in their business case. In the case of Bromley, for example, the increase was 71%. The authors concluded: “The [PFI] contracts provide numerous ways of increasing the charges under conditions where the trusts are locked into a monopoly supplier,” thereby “raising questions about the power of contractors to charge higher than normal prices (despite benchmarking arrangements)” (p. 107). It is reasonable to conclude from this study that cost overruns have been a feature of some PFI schemes in the NHS, and that these have presented significant risks to value for money. However, the extent to which these cost increases were related to overruns in *construction* (as opposed to operation) cannot be identified from the study.

(ii) Construction costs, whole-life costs and innovation

In terms of the relative cost of construction between PFI and conventional procurement, the most important factor is the outturn price – i.e. the price that is actually paid by the purchaser for the delivery of the construction project. Unfortunately, good evidence on outturn prices in terms of NHS construction procurement (PFI and non-PFI) does not exist. A sophisticated examination of the relative cost of construction under private finance and public finance arrangements does, however, exist for the PFI roads sector (Blanc-Brude *et al* (2006). This study, carried out by European Investment Bank (EIB) economists, used a multiple regression analysis to test the hypothesis that privately financed contracts will exhibit higher *ex ante* construction costs than conventional procurements. It employed a database of 227 road projects (including 65 PFIs) financed by the EIB between 1990 and 2005. The study found that, on average, the *ex ante* construction cost of PFI road projects were 24% higher than equivalent schemes procured conventionally. This compared with average post-contractual cost increases in conventionally procured EU roads projects of 22% (Flyvbjerg *et al* 2002). In other words, the *outturn* cost of construction was slightly higher in the case of privately financed schemes when compared to those conventionally procured.

While a degree of care is required in applying results taken from one part of the public sector to another, the evidence does not support the conclusion that the outturn cost of construction under PFI would be lower than for an equivalent project using public capital. In other words, there is currently no evidence to suggest that the PFI capital structure generates cost-savings in construction to offset (partly or fully) the higher financing costs.

There remains the possibility, however, that the quality of the construction works is higher, which may enhance cost-efficiency by reducing the whole-life costs. The available evidence is extremely sparse, but what there is does not support the conclusion that quality is higher. The National Audit Office commissioned the Building Research Establishment (BRE) to analyse the build quality of eight PFI hospitals and eight conventionally procured "comparator" hospitals (National Audit Office 2007a). The 16 hospitals were assessed against a range of design indicators, including the quality of the architecture, environmental engineering, user comfort, whole-life costing, design detail and user satisfaction. Scores against indicators were given with a range of 0 (very poor) to 5 (outstanding), with 4 and 5 judged by BRE as “best practice” and 3 as “good practice”. The BRE judged that, on all six indicators, there were “no meaningful differences” in build quality between PFI and non-PFI hospitals. However, given the centrality of whole-life costing to the case for PFI, it is notable that the median average scores for whole-life costing were some 0.4 higher in the publicly financed hospitals, with an average of 3, compared with 2.6 for the PFI hospitals. This result was reached despite the fact that the average age of the conventionally financed comparator hospitals was around 20 years older than that of the group of PFI projects.

Barlow and Köberle-Gaiser (2009) undertook documentary analysis and interviews to investigate the degree of innovation in the design and construction of PFI hospitals in the UK. They examined evidence from six case studies drawn from “early” PFI schemes (p.11), the identities of which were not revealed. The study reported the words of one respondent (an SPV project director) as follows: “PFI stifles innovative solutions. Investors and financers are not interested in innovation; they do not want to take risk” (p.15). The study concluded that the PFI contractual structure had led to a “fragmentation in responsibilities” and an “inefficient allocation of risks” between SPV parties which had “impeded innovation” (p.19). This finding is in direct opposition to the alleged cost efficiency advantages of “bundling” the design, build, finance and operation functions through the PFI contractual structure.

To sum up on the design and build performance of PFI, the best evidence available suggests that the cost of construction under PFI will be similar (or slightly higher) than for an equivalent conventionally procured scheme, and that the quality will be similar (or slightly lower). There is no evidence to suggest that the level of innovation - of the type, for example, that would improve build quality and enable the PFI provider to reduce whole-life costs over the contract period - is higher under PFI than other forms of procurement. There is some evidence that PFI projects deliver to time and to cost more frequently than publicly financed projects but this has not yet been convincingly shown due to the absence of data.

The apparent conflict between the predictions of policy advocates and the empirical reality in this context may be explained once the impact of private finance on contractual performance is considered. As already noted, providers of senior debt exert a powerful influence on the contractual structure of a PFI scheme, carrying out due diligence services (eliminating optimism bias from the SPV's projections), and allocating risk to the party best able to manage it so as to ensure that the project will generate sufficient cash-flow for the debt to be repaid. Given that on a PFI scheme an SPV will generate cash-flow only after it is complete and successfully in operation (incentivising delivery to time and to budget), senior debt providers in particular are likely to favour conservative, as opposed to innovative, design and construction solutions, even where these solutions fail to maximise cost-effectiveness in the operational period (the costs of which are, in any case, borne by the procurer) (Hellowell 2010). To this extent, the use of private finance may *weaken* incentives for whole-life solutions over those in place in a publicly financed design and build scheme.

5.43 Service provision

(i) The cost and quality of maintenance

The potential for PFI to deliver buildings maintenance with greater cost efficiency than the alternatives is a key element of the value for money case for this model of procurement. As the National Audit Office noted (2003), under PFI, “bidders are encouraged to take a longer term view of the design of the asset. For example, by designing and building the asset to a standard that will reduce maintenance costs throughout the contract period the consortium can reduce its long term costs while ensuring that it meets the department's service requirements” (p.7). The Treasury’s *PFI Value for Money Quantitative Assessment* spreadsheet has a hardwired assumption that maintenance will cost less under PFI than under public procurement, as in the latter “there is limited planned maintenance, with periodic and costly major maintenance required to remove the backlog” (2007b, p.38).

The prediction, then, is that PFI will be associated with cost savings in the provision of maintenance when compared to provision in publicly procured hospitals. The evidence that the quality of the design and build provided under PFI has been no better than that associated with conventional procurement (discussed above) provides *prima facie* evidence that this is not the case. There is, in fact, no evidence that PFI SPVs are spending more on construction quality in order to reduce expenditure over the long-term. In addition, recently published evidence from the National Audit Office, based on Estates Returns Information Centre (ERIC) data produced by the NHS, found that average annual maintenance expenditure was higher in PFI hospitals than in non-PFI hospitals. Though data on quality does not exist, 20% of hospital trusts surveyed stated they were not satisfied with the standard of maintenance provided under PFI contracts (Public Accounts Committee 2010).

A National Audit Office (2007a) report on operational performance contains the results of interviews with managers at 19 NHS Trusts with operational PFI hospitals on the quality of maintenance. It found that half the Trusts considered availability deduction schedules to be inadequate to ensure that PFI contractors return unavailable areas to use as soon as possible, providing an indication of insufficient risk-transfer. A particular problem was reported in respect of reactive (as opposed to planned) maintenance where only a third of managers recorded performance as good, with a further third describing performance as “adequate” and a third as either “poor” or “very poor”. However, 14 of the 19 hospital managements in the PFI hospitals considered that, in general, the maintenance of buildings had improved when compared to their experiences in older publicly funded hospitals.

(ii) The cost and quality of support services

Data on the cost and quality of non-clinical services have been collected by the NHS Healthcare Commission (now the Care Quality Commission), which has made publicly available the results of a one-off review which included facilities management costs and service quality across all NHS Trusts in England and Wales as part of its Acute Hospital Portfolio project (Healthcare Commission 2005). This allows for a comparison between 12 operational PFI hospitals and 141 non-PFI hospitals in terms of the following categories of hospital support services: security; linen and laundry; portering services; and cleaning.

On security, the average cost per square metre in the PFI group was £3.13, £0.10 more expensive than the average for the non-PFI hospitals. However, quality, as scored by ward managers, was somewhat higher with an average score of 4.6 out of a possible 5, versus 4 for the non-PFIs. On linen and laundry, costs per bed in the PFI hospitals were an average of £1,204, £137 higher than the average cost in the non-PFI hospitals. On quality, relative performance varied according to the measure used. The Commission's assessment was based on rejection rates, estimates of late deliveries and serious shortages. Rejection rates were on average higher in the PFI hospitals, but late deliveries and shortages were lower.

On portering, both cost and quality was lower in the PFI hospitals than the non-PFI hospitals. The cost of portering per square metre was £11.82 in the PFI schemes, versus £10.65 in the non-PFI hospitals. Portering quality was measured by asking ward managers about response times for these services, with scores between 0 and 5 representing "poor" to "good". The PFI hospitals scored 2.8 on this schema, with the non-PFIs scoring 3. On cleaning – perhaps clinically the most important of the support services provided by the private sector under PFI contracts - the Commission's data shows that PFI was associated with higher costs and lower quality. The cost of cleaning per square metre was £22.77 in the PFI hospitals versus £20.47 in the non-PFI hospitals. Cleaning standards were significantly lower in PFIs relative to the non-PFI hospitals – with a score of 2.7 versus 3.4, respectively.

The National Audit Office (2010a) examined the costs of support services delivered through PFI and conventional procured hospitals using ERIC data (as described above). The results of this study are consistent with those drawn from the Healthcare Commission data. The audit body found that: "the range of costs for PFI services overlaps considerably with that of the same services provided outside of PFI contracts. The extent of the overlap is such that the costs are broadly the same between PFI and non-PFI hospitals for all services” (p.23).

Turning to the issues of quality, the audit body examined Patient Environment Action Team (PEAT) scores – annual assessments of all NHS sites in England, carried out by NHS staff and patient representatives, using objective criteria to assess the quality of the hospital environment. The report suggested that these scores could be used to see if there was a systematic difference in the standard of the environment - a proxy for the quality of cleaning and catering - in PFI hospitals compared to those of non-PFI hospitals. It found that PFI hospitals “are not performing significantly better or worse than other hospitals” (p.17).

5.5 Conclusion

To sum up this literature review on the economic performance of the PFI compared with a conventional public alternative, the best available evidence suggests that the costs of the construction, maintenance and service provision elements of the PFI model in the NHS are broadly similar to that provided in hospitals that were conventionally procured. It appears that the outturn costs of construction and the costs of service provision are very similar to the equivalent costs in conventionally procured infrastructure, though the maintenance cost is somewhat higher. In terms of quality, the evidence suggests that the operational components of PFI are delivered to the same standard as those in conventionally procured facilities, though comparative data is unavailable in the case of maintenance. There is, in other words, no evidence that there are cost savings or quality improvements in the operational elements of the PFI structure sufficient to offset the higher cost of finance.

It is evident that, if the outturn costs of construction, maintenance and service provision are about the same under PFI compared with conventional procurement, the higher cost of private finance represents a loss to the NHS purchaser. In this context, it is important that policy makers seek to ensure that the return to investors does not exceed the fair level. Any element of excess return would in this case represent an additional loss to the NHS purchaser, thereby providing an additional burden on its revenue budget and limiting the health system's capacity to undertake further capital investment. Both constraints will erode the sustainability of the health system and its ability to meet population health needs.

To date, empirical evidence has not conclusively identified the extent to which investor returns are in excess of the fair rate. The Treasury view is that competition in the market ensures that the return on risk is set at the rate required to compensate investors for bearing risk. Yet the degree to which the markets for primary investments in PFI projects are in fact competitive has not been established. While there has been a good deal of literature on the magnitude of the return to investors on PFI projects, evaluation has proved more difficult owing to the absence of data. Formal evaluation, within a Capital Asset Pricing Model framework, is limited to just one study, published in 2002. Yet assessing the fairness of returns is an important element of understanding the cost efficiency of this form of capital financing. Given current budgetary difficulties among some NHS organisations, and additional threats to solvency as the degree of risk pooling within the NHS is curtailed, it is important to know whether these organisations are being over-charged for their capital.

6. Methodology

6.1 Introduction

As described in Chapter 1, this thesis incorporates two substantive empirical components: (i) an evaluation of the returns projected (at the point of contract signature) to PFI investors with reference to the amount of risk to which the relevant returns are subject; and (ii) an analysis of the sources of any identified excess returns through an examination of the *structure* and *competitiveness* of the markets for equity and debt. Below, the methods for measuring: (a) the returns projected by investors, (b) the level of concentration, (c) the entry/exit dynamics and (d) the competitiveness of the procurement process are outlined. The methods by which these measures are to be evaluated are outlined in Chapters 7 and 8, along with the results of the research.

6.2 Identifying the cash flows and measuring the return

6.21 Data sources

The analysis of returns to investors is based on the *financial models* of 11 PFI projects commissioned by NHS organisations between 1997 and 2002 (see Table 6.1 on p.163). The financial model is a spreadsheet in which a Special Purpose Vehicle's financing arrangements and those of its creditors are outlined. The model is developed by the SPV's financial advisers immediately prior to the contract being signed, and outlines the following:

• the *sources* and amounts of finance to be drawn down by the SPV;

• projections of the *uses* of funds, including capital expenditure and operating costs, and

• projections of the *cash flow* available for each provider of finance and the overall cash available for distribution to investors in the project over the full period of the contract.[55]

The role of the financial model varies according to the phase of the project. During the final stages of bidding and negotiations, the model serves as a means of ensuring that the agreed unitary charges will cover the projected capital and operational expenditure, along with returns required by investors of both debt and equity. Consequently, it is the key document used in the due diligence process undertaken by senior debt providers (Yescombe 2008).

At financial close, the model prepared by the preferred bidder's financial adviser is reviewed by the public authority, which carries out "reasonableness checks" to ensure that the proposed solution is viable (PricewaterhouseCoopers and Franks 2002), and that it can deliver the initial investment required and meet the long-term service requirements. The financial model is an important component of the agreement between the NHS purchaser and the SPV, and a copy of the *Base Case* financial model is typically included as an appendix to the contract (Yescombe 2008; HM Treasury 2007c). The group of 11 financial models used as this chapter's data set are Base Case models – i.e. those extant at the time of financial close, and the agreed financial basis of the contracts. In the case of one project – the Norfolk and Norwich University Hospital PFI – post-refinancing data is also available with the financial model, enabling an analysis of the dynamics of this process, and in particular an examination of the impact of refinancing on the timing of cash-flows (see Appendix C).

[55] A more detailed description of the main inputs into a financial model is provided in Chapter 3 of this thesis.

6.22 Data collection

Between January 2008 and May 2010, contract documents and financial models were sought from 112 NHS organisations involved in 123 PFI contracts through email requests made under the UK's Freedom of Information Act (2000) (relating to UK government departments and public authorities in England, Wales and Northern Ireland) and the Freedom of Information (Scotland) Act (2002) (relating to public authorities under the jurisdiction of the Scottish Parliament). All but two NHS organisations refused to disclose the documents on the grounds that these contained commercially sensitive information (the exceptions were NHS Lothian and NHS Lanarkshire, which provided financial models relating to three PFI contracts). The author followed up all initial refusals with requests for "internal reviews" (i.e. reviews of non-disclosure decisions, undertaken by senior employees within the authority concerned), in line with the provisions of the respective Acts. Following these reviews, 100 NHS organisations upheld decisions not to release the requested documents.

In justifying non-disclosure, the majority of NHS organisations in England, Wales and Northern Ireland cited section 43.2 of the FOIA, under which information is exempted from the requirement to disclose where this is likely to prejudice the commercial interests of any person (including the public authority holding it), while in Scotland the majority cited the equivalent exemption contained in Section 33.2 of the Act. Section 43.2 of the UK Act (and Section 33.2 of the Scottish Act) constitutes a 'qualified exemption', meaning that its use by a public authority is subject to a 'public interest test' in which the argument that the commercial interests of a named party may be prejudiced by disclosure is balanced against the argument that the release of the information may serve the public interest.[56] However, only a small minority of these responses contained any detail of this mandatory public interest test. When the NHS organisations were made aware of their duties under the respective Acts, the majority in England, Wales and Northern Ireland chose to additionally cite section 41.1 of the UK Act, while Scottish authorities cited section 36.2 of the Scottish Act, both of which provide that information is exempt from disclosure if it was obtained by the public authority from any other person and where that disclosure would lead to an actionable breach of confidence. In both Acts, these sections constitute an absolute exemption and therefore no public interest test is required in order to justify their use.

This led to an extensive period of bilateral negotiations, conducted via email, between these senior NHS employees and the author. It was pointed out by the author that, while no public interest test is required to justify the citation of these exemptions, under the common law, a duty of confidentiality can be overridden if there is an overriding public interest in disclosing the information concerned (Information Commissioner's Office 2010). This had been demonstrated in case law. In *Derry City Council (EA/2006/0014)* the Information Tribunal found that there did not have to be an exceptional case to override the duty of confidence. Instead, disclosure would be lawful if the public interest in disclosure outweighed the public interest in maintaining the duty of confidence. It was further argued that there was a strong case for the public to have access to these documents, and the information within them would enable the public to assess the reasonableness of the price

[56] The wording of Section 42.2 (UK Act) and 33.2 (Scottish Act) are almost identical. However, the Scottish Act is slightly more favourable towards the release of information since non-disclosure decisions must be justified by a demonstration that a party's commercial interests would be "substantially prejudiced" by disclosure, while the UK Act excludes the adjective. It is unclear whether this impacted on Scottish authorities' responses - though the early decisions to disclose by NHS Lothian and NHS Lanarkshire are noteworthy in this respect.

being paid by the public sector for the services involved in PFI contracts. The progress of these negotiations – at least outside of Scotland - halted abruptly in March 2008, when guidance was issued by the Department of Health to all NHS Trusts in England informing them that they should not release financial models to the author. This letter, from Christian Richardson, Briefing and Investment Officer at the Department of Health, said as follows[57]:

> "We understand that a Freedom of Information request has been made to every PFI scheme with a signed deal for a copy of the FBC and financial model. Whilst Trusts are autonomous corporate bodies and must ultimately interpret FOI for themselves, our advice is as follows: DH consultants are of the opinion that the financial model probably contains information that is commercially sensitive, in that it could contain the pricing strategy of the PFI partner. Publicly available documents such as the FBC already have deletions on grounds of commercial in confidence under the old NHS openness rules, which is equally applicable under the new FOI commercial in confidence exemptions. Before publishing more information the Trust or PCT should seek the views of their PFI consortium partner."

In Scotland, negotiations continued but in each case the decision not to disclose was maintained by NHS organisations, following increasingly involved discussion of relevant case law. For example, the final response from NHS Forth Valley, received in an email on 21 November 2008, ran to some 1,411 words (NHS Forth Valley 2008). It stated that the decision not to release the requested information had been taken "only after extensive discussion with our project partners and advisers [and] included a review of recent case law and recent Freedom of Information decisions in Scotland and England" (p.1). NHS Forth Valley's final decision not to disclose was based on a consideration of the Derry City Council case mentioned above in which the Information Tribunal stated (at paragraph 32(e)) that:

[57] This document was shared with the author by the Information Governance Lead at the Sherwood Forest Hospitals NHS Foundation Trust on 28 November 2008 and constituted the final refusal of the FOIA request.

> “…contracts would sometimes record more than just the mutual obligations of the contracting parties. They will also include technical information, either in the body of the contract or, more probably, in separate schedules. Depending again, on the particular circumstances in which the point arises, it may be that material of that nature could still be characterised as confidential information ‘obtained’ by the public authority from the other party to the contract.”

As the financial model is typically contained within a schedule of the contract and, as noted above, is constructed by the special purpose vehicle or its advisers and subsequently shared with the public sector for the purpose of its due diligence, NHS Forth Valley concluded that the ruling in the Derry City Council case supported its decision not to disclose the document.

Under the terms of the UK FOI Act (like its Scottish equivalent), complaints about non-disclosure can be made to the Information Commissioner’s Office (ICO), which has the power to adjudicate on disputes relating to FOIA requests. Therefore, in the case of one project, undertaken by the Mid Yorkshire NHS Trust, the author referred the matter to the ICO in February 2009. The aim was, partly, to gain access to this particular financial model, but the more important objective was to establish whether the non-disclosure of financial models could, in the ICO’s decisive opinion, be justified by citation of section 41.2.

Unfortunately, the Office found that the Trust’s decision not to disclose the financial model was in accordance with the provisions of the Act. In his decision notice (ICO 2010), the Information Commissioner made a number of observations in support of this decision:

i). the information had been provided to the public authority with an expectation of confidentiality and the SPV had an expectation of confidence when it provided it;

ii). disclosure would have a detrimental impact on the SPV's commercial interests, enabling competitors of the SPV to adjust their own prices in order to win future public contracts;

iii). case law (Bluck v IC & Epsom & St Helier University NHS Trust (EA/2006/0090)) shows that it is in the public interest that confidences made by public bodies should be respected;

iv). two decisions reached by the Scottish Information Commissioner (Decision 104/2009 and Decision 122/2009) resulted in the upholding of decisions to not disclose PFI project financial models on grounds of section 36.2 of the Freedom of Information (Scotland) Act;

v). Contrary to the view expressed by the complainant (i.e. the author), it is the overall pricing structure rather than how those prices were arrived at that would be of most significance in assessing the value for money of the proposed PFI project; and therefore

vi). the public interest in disclosure is outweighed by the public interest in maintaining the duty of confidence.

Ultimately, nine NHS organisations – seven in England, two in Scotland - provided the requested information to the author, and a group of 11 financial models were received in all. (Two NHS organisations - Hull & East Yorkshire NHS Trust and NHS Lanarkshire - provided financial models relating to two hospital projects). The remaining 102 NHS organisations ultimately refused to disclose these documents. Given the Information Commissioner's decision, and the weight of case law in favour of non-disclosure, it seems likely that financial models and related documentation will be difficult to obtain in future.

6.23 Description of the data

Standard discounted cash flow methods for measuring investor returns are outlined in detail in Chapter 3, but are briefly described here. When considering an investment, an investor will estimate the cash flows it expects to expend/ receive in each period within a determined interval (such as a contract period), and discount these cash flows at a rate designed to equal the rate of return on capital market securities with the same risk – i.e. the investment's *cost of capital*. This produces a *Net Present Value* (NPV) for the investment.

The NPV is conventionally regarded as the "gold standard" for investment appraisal in corporate finance, and is widely used in practice (Graham and Harvey 2002). However, as an *absolute* measure of return, the NPV can be a crude or even inappropriate technique when used to compare the profitability of differently sized projects. For this reason, most investors supplement the NPV analysis with a *relative* profitability measure, the *Internal Rate of Return* (Brealey *et al* 2008). The NPV and the IRR are related concepts as, mathematically speaking, the IRR is the discount rate that brings the NPV of a stream of cash-flows to zero. It can be regarded as the compound interest rate on the investment.

Despite its popularity, the IRR has weaknesses. Of these, the most significant in a PFI context is generated by the re-investment assumption within the IRR formula (Copeland *et al* 2005). The calculation of IRR for a stream of annual cash-flows involves discounting each periodic cash-flow at the IRR. The implicit assumption is that the cash received in each period can be reinvested at the IRR - but this is only accurate if the IRR is equal to the cost of capital for the investment. The effect is that the IRR over-values early cash flow and under-values cash flow further into the future (Yescombe 2008). This is a problem for blended equity cash flows in particular, as income cash flows are concentrated towards the end of the contract.

Given the problems of both NPV and the IRR, a third measure of return - the *benefit-cost ratio (BCR)* – is commonly used by investors (Brealey *et al* 2008). The BCR is the ratio of the present value of the revenue cash-flows to the present value of the initial investment. It is evident that this method is closely related to the NPV and the IRR since, if the BCR is higher than 1, the NPV on a project is positive and the IRR is higher than the cost of capital. However, the BCR has an advantage over the NPV in providing a measure of return that is referenced against the size of the initial investment and thus, unlike the NPV, enables differently sized projects to be compared. In addition, the BCR formula does not contain the problematic reinvestment assumption of IRR, and is better correlated with the NPV. In the analysis in this thesis, both IRRs and BCRs are calculated for each of the 11 data set projects.

6.24 Selection of cash-flows

Two forms of cash-flow provide the focus of analysis: the *Free Cash Flow to Blended Equity* (FCFBE) and the *Free Cash Flow to the Project* (FCFP). The former is the total cash available to SPV investors after meeting all operational costs, including those associated with lifecycle maintenance, facilities management and insurance, and making payments of capital and interest to senior debt providers. The latter is the cash flow available to all investors, being the cash available after paying operational costs, including tax, but before debt payments (Gatti 2007). The return outputs that are generated by these cash-flow streams are termed, according to Treasury convention (HM Treasury 2007a), the *Blended Equity IRR/BCR* and *Project IRR/BCR,* respectively. These measures are the focus of financial assessment among investors and the government in terms of its business case approval process (HM Treasury 2007a), being respectively the weighted return on the quantity of SPV capital invested on the project, and the post-tax return on all sources of private capital involved in the project.[58]

In addition, the examination of financial models provides additional information on certain dynamics of project finance, specifically: (1) the change in project finance structures before and after refinancing; (2) the length of the period at the end of contracts in which senior debt payments reduce to zero, but unitary charges continue to be paid (the "tail period"); and (3) debt service cover ratios. These are important additional indicators of the extent to which project finance structures are likely to be cost efficient from the perspective of the NHS organisation involved (Yescombe 2008). However, as these analyses are not an integral component of the aims of this thesis, they are described and evaluated separately from the core analysis in Chapter 7. Appendix B provides a descriptive account of the tail periods and cover ratios revealed in the financial models of each scheme, while Appendix C provides a case study illustration of the impact of refinancing on the distribution of investor cash flows.

Financial models provide a range of data that enable the cash-flows accruing to different types of investor, and to the project overall, to be identified. Specifically, the *Free Cash Flow to Blended Equity* (FCFBE) and the *Free Cash Flow to the Project* (FCFP) can be identified. As noted above, these provide the data required to calculate the Blended Equity and Project IRRs along with the corresponding BCR values. Below, a summary of the data in respect of the Sandwell and West Birmingham financial model is provided, in order to illustrate: (i) the

[58] It is necessary to use the *post-tax* Project IRR to ensure comparability with Weighted Average Cost of Capital benchmarks which, as outlined in Chapter 7, include an estimate of the "tax shield" attributable to debt.

flows of cash that can be identified, (ii) how these are constructed and presented in the financial models, and (iii) how these enable the calculation of returns for FCFBE and FCFP.

Figure 6.1 (overleaf) illustrates the principal cash-flows and their dynamics for the Sandwell and West Birmingham PFI project. The blue line plots the total capital expenditure that the SPV expects to commit to the project (via equity and debt), followed by the total income (i.e. the unitary charge) that the NHS purchaser has agreed to pay annually. After netting the estimated operational costs (in respect of capital investment, maintenance, support service provision, life-cycle maintenance and insurance), the FCFP is derived, and plotted on the red line.[59] It can be seen that the FCFP accounts for a significant proportion of the unitary charge across the contract period (it accounts for between 54% and 78% of the unitary charge in each year, and 65% on average). It can also be seen that a large proportion of the FCFP is allocated to the repayment of senior debt principal and the payment of debt interest for the bulk of the contract period. The remainder of the FCFP constitutes the amount of free cash that is projected to be available for distribution to the SPV's investors.

In the Sandwell and West Birmingham case, the free cash flow to blended equity comprises the drawdown and remuneration of four types of finance provided by the SPV, namely: loan stock, subordinated debt, bridging equity and share capital. The sum of these cash-flows, together with a small amount of interest on cash deposits, is the FCFBE. This is a relatively small proportion of overall cash flow, reflecting the strong weighting towards senior debt in

[59] The method by which the FCFP has been derived has varied with the project. For a minority of the schemes, a row in the financial model provides the post-tax project cash-flow. For most projects, however, it has been necessary to calculate the FCFP from other cash-flow data within the models. Where this is the case, the FCFP has been generated by: subtracting projected operational expenditure from the projected revenue (primarily, the unitary charge); subtracting initial and replacement capital expenditure, leaving a pre-tax cash-flow projection; and adjusting the cash-flow for corporation tax (30%) to derive the post-tax cash-flow to investors.

the financial structure. However, in the final year of the payment interval (i.e. the tail period) this cash flow increases significantly. As there is no senior debt payment in this year, the full unitary charge, net of operational costs, is available for distribution to equity.

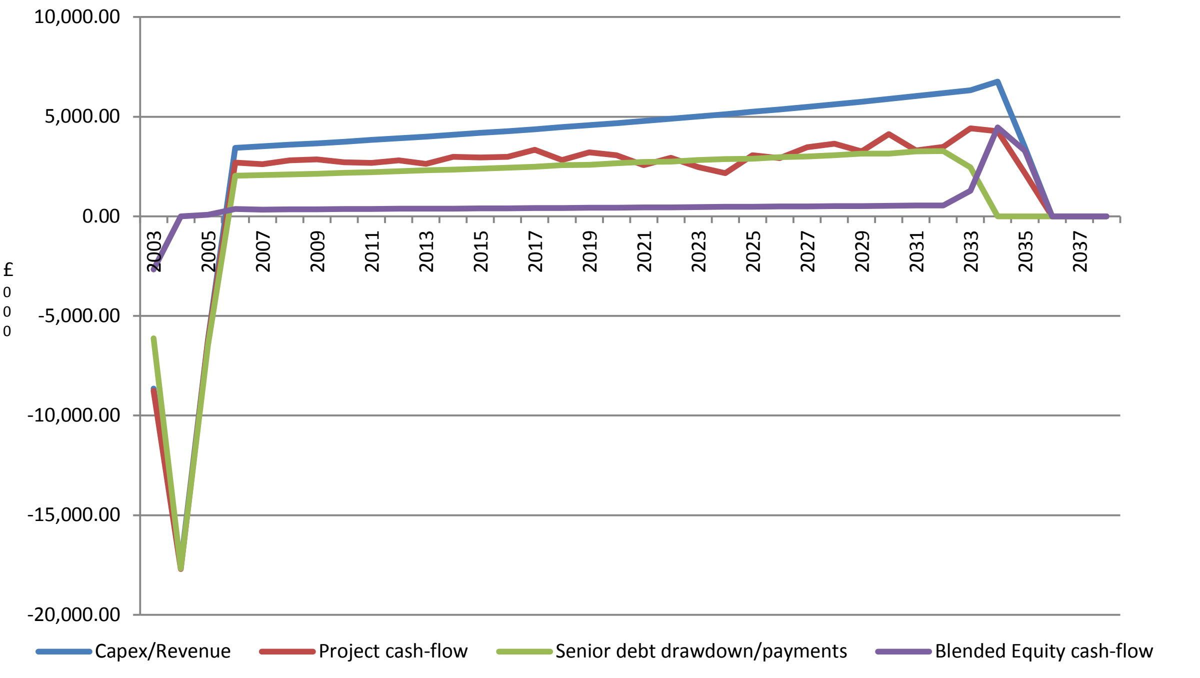


Figure 6.1 Sandwell and West Birmingham - capital expenditure, revenue, Free Cash-flow to the Project, payments to senior debt, and Free Cash-flow to Blended Equity

The IRR on these cash flows (Table 6.1 on p. 163) is calculated using the Excel IRR function "=IRR(range)". In some cases, unitary charges are scheduled to be made bi-annually. On the six projects for which this is the case, the IRR returned by the Excel function has to be adjusted in order to take account of the way that the cash flows are distributed, according to the standard formula: IRR = $(1 + \text{IRR})^2 - 1$. The BCRs on these cash flows, meanwhile, are calculated by discounting the annual or bi-annual cash flows at a discount factor referenced to the relevant cost of capital. The resulting discounted cash flow is then summed to derive present values. Dividing the present value of the revenue component of the cash flow by the present value of the capital expenditure cash flow produces the BCR values. The analytical approach used to derive the relevant discount rates is outlined in Chapter 7.[60]

6.25 Description of the data set

The 11 schemes are drawn from a total population of 123, and represent about 8.5% of the total PFI programme by capital value. The average capital value of the 11 schemes is £96.72 million – which is close to the average across the 123 schemes, of £102.2 million (Partnerships UK 2010). Blended Equity and Project IRRs for the projects are shown in Table 6.1 (overleaf), along with the duration of the contracts (i.e. the period between financial close and the end of the payment period), and capital values. The BCRs on Blended Equity and the Project are presented in Chapter 7, as these are important outputs of the analysis and calculating them requires an appropriate discount rate. Conversely, the inclusion of the IRR figures in this methodology chapter underlines the point that this thesis has the objective of *evaluating* the projected rates of return to PFI investors not *describing* them.

[60] The calculation of discount rates for the FCFBE does not require the cash flow data contained in financial models, as these are not determined on a project-specific basis (though calculating the BCRs on FCFBE does). However, as discussed in Chapter 7, discount rates for the BCR on the FCFP do require the cash flow data in financial models, since both senior debt cash flows and the FCFBE are required to identify the level of financial *gearing* (i.e. the ratio of debt to equity in the SPV's financial structure) at each period of the contract.

Table 6.1 Contract duration, capital expenditure and IRRs (Equity and Project) for the 11 projects				
NHS purchaser: project	**Contract duration**	**Capital expenditure (£m)**	**Blended Equity IRR (%)**	**Project IRR (%)**
North Cumbria Cumberland Infirmary rebuild[i]	11/1997 to 11/2032	85.42	17.8	9.64
Norfolk/Norwich[61] Acute hospital rebuild[ii]	01/1998 to 01/2038	233	18.64	10.72
Durham and Darlington General Hospital rebuild[iii]	03/1998 to 03/2031	111.8	14.5[62]	10.7
NHS Lanarkshire Hairmyres Hospital rebuild[iv]	03/1998 to 05/2031	86.15	22.58	9.71
NHS Lanarkshire Law hospital rebuild (Wishaw)[v]	07/1998 to 11/2029	148.4	15.43	10.4
NHS Lothian Royal Infirmary of Edinburgh[vi]	08/1998 to 03/2028	267.83	19.72	9.79
Nottingham University Queen's Medical Centre[vii]	05/1999 to 12/2035	17.7	14.79	8.21
East/North Hertfordshire Herts and Essex Hospital[viii]	05/2001 to 06/2035	14.1	15.86	8.22
Hull/ East Yorks Hospitals Castle Hill hospital rebuild[ix]	05/2001 to 05/2031	8.9	13.86	10.05
Sandwell/West Birm'm Ambulatory care centre[x]	12/2002 to 12/2038	36.7	12.43	7.22
Hull/ East Yorks Hospitals Oncology wing development[xi]	03/2006 to 01/2036	53.9	21.2	6.04
Total/ Average	-	**1,064/ 96.72**	**16.98**	**9.15**

[i] Carlisle Hospitals NHS Trust (1998); [ii] Norfolk & Norwich University Hospitals NHS Trust (2001); [iii] University Hospital of North Durham NHS Trust (1998a); [iv] Lanarkshire Acute Hospitals NHS Trust (1998a); [v] Lanarkshire Acute Hospitals NHS Trust (1998b); [vi] Royal Infirmary of Edinburgh NHS Trust (1998); [vii] Nottingham University NHS Trust (1999a); [viii] Royston, Buntingford and Bishop's Stortford PCT (2001); [ix] Hull & East Yorkshire NHS Trust (2001a); [x] Sandwell and West Birmingham Hospitals NHS Trust (2002); [xi] Hull & East Yorkshire NHS Trust (2006).

Table 6.2 (overleaf) shows the breakdown of capital expenditure into its uses (i.e. design and build costs, interest and development costs, and other capital costs); and the sources of the finance (i.e. debt, subordinated debt and pure equity). On average, the design and build costs comprise 75% of the capital expenditure (range 68% to 80%). It is also evident that the ratio of senior debt to equity at financial close is balanced heavily towards debt. On average, some 88% of the capital expenditure is senior debt-financed (range 80.4% to 91.9%).

[61] Data refers to the actual and projected costs and revenues in the pre-refinancing base case financial model.
[62] This figure is taken from the summary sheet of the financial model, as the Free Cash Flow to Blended Equity cannot be calculated from information in the financial model using a method consistent with other schemes.

Table 6.2 Uses and sources of capital raised for delivery of the 11 data set projects

NHS Project	Uses of capital (£m)		Sources of capital (£m)	
North Cumbria Cumberland Infirmary rebuild[i]	• Design & Build: 67.01 (78.4%) • IDC: 15.67 (18.3%) • Other: 2.74 (3.2%); **Total: 85.42**		• Senior Debt: 75.7 • Blended Equity: 9.7 • **Total: 85.42**; • Gearing: 88.6:11.4	
Norfolk/Norwich[63] Acute rebuild[ii]	**Base Case** • Design & Build: 159 (71.3%) • IDC: not available • Other: not available **Total: 233**	**Post-refinancing** *(Uses not applicable)* **Total: 339.6**	**Base Case** • Senior Debt: 200 • Blended Equity 33 **Total: 233** • Gearing: 86:14	**Post-refinancing** • Senior Debt: 306 • Blended Equity 33 **Total: 339** • Gearing: 90:10
Durham and Darlington General Hospital rebuild[iii]	• Design & Build: 82.7 (74%) • IDC: 18.8 (16.8%) • Other: 10.3 (9.2%); **Total: 111.8**		• Senior Debt: 77.3 • Blended Equity: 18.8 • Land sales/revenue 15.7 **Total: 111.8 ;** • Gearing: 80.4:19.6	
NHS Lanarkshire Hairmyres Hospital rebuild[iv]	• Design & Build: 67.5 (78.4%) • IDC: 9.5 (11%) • Other: 9.15 (10.6%); **Total: 86.15**		• Senior Debt: 77.75 • Blended Equity: 8.4 **Total: 86.15**; • Gearing: 90.2:9.8	
NHS Lanarkshire Law hospital rebuild (Wishaw)[v]	• Design & Build: 103.4 (69.7%) • IDC: 15.610 (10.5%) • Other: 29.39 (19.8%); **Total: 148.4**		• Senior Debt: 136.67 • Blended Equity: 11.76 **Total: 148.4**; • Gearing: 91.9:8.1	
NHS Lothian Royal Infirmary of Edinburgh[vi]	• Design & Build: 201.41 (75.2%) • IDC: 49 (18.3%) • Other: 17.43 (6.5%); **Total: 267.8**		• Senior Debt: 201.41 • Blended Equity: 29 • land sales/revenue: 38 **Total: 267.8**; • Gearing: 88:12	
Nottingham University Queen's Medical Centre[vii]	• Design & Build: 13.43 (75.9%) • IDC: 0.95 (5.4%) • Other: 3.32 (18.8%) **Total: 17.7**		• Senior Debt: 15.9 • Blended Equity: 1.78 **Total: 17.7** • Gearing: 89:11	
East/North Hertfordshire Herts and Essex Hospital[viii]	• Design & Build: 11.23 (79.6%) • IDC: not available • Other: not available **Total: 14.1**		• Senior Debt: 12.7 • Blended Equity: 1.4 **Total: 14.1** • Gearing: 90.1:9.9	
Hull/ East Yorks Hospitals Castle Hill hospital rebuild[ix]	• Design & Build: 6.7 (75.3%) • IDC: 0.47 (5.3%) • Other: 1.69 (19%) **Total: 8.9**		• Senior Debt: 7.7 • Blended Equity: 1.2 **Total: 8.9** • Gearing: 85:15	
Sandwell/West Birm'm Ambulatory care centre[x]	• Design & Build: 29.6 (80.7%) • IDC: 2.9 (7.9%) • Other: 4.2 (11.4%) **Total: 36.7**		• Senior Debt: 33.3 • Blended Equity: 2.99 • Revenue: 0.2 **Total: 36.7** • Gearing: 91.3:8.7	
Hull/ East Yorks Hospitals Oncology wing development[xi]	• Design & Build: 44.54 (82.5%) • IDC: 5.15 (9.5%) • Other: 4.27 (7.9%) **Total: 53.96**		• Senior Debt: 49.21 • Blended Equity: 4.74 **Total: 53.96** • Gearing: 91.2:8.8	

[i] Carlisle Hospitals NHS Trust (1998); [ii] Norfolk & Norwich University Hospitals NHS Trust (2001); [iii] University Hospital of North Durham NHS Trust (1998a); [iv] Lanarkshire Acute Hospitals NHS Trust (1998a); [v] Lanarkshire Acute Hospitals NHS Trust (1998b); [vi] Royal Infirmary of Edinburgh NHS Trust (1998); [vii] Nottingham University NHS Trust (1999a); [viii] Royston, Buntingford and Bishop's Stortford PCT (2001); [ix] Hull & East Yorkshire NHS Trust (2001a); [x] Sandwell and West Birmingham Hospitals NHS Trust (2002); [xi] Hull & East Yorkshire NHS Trust (2006).

[63] Data refers to the actual and projected costs and revenues in the pre-refinancing base case financial model.

6.3 Market structure and competitiveness

6.31 Data collection: concentration and entry/exit dynamics

In order to measure the size of the investment market for new PFI hospital projects and changes over time, the names, capital values[64] and dates of financial close for each hospital PFI project commissioned by NHS organisations (in England, Scotland, Wales and Northern Ireland) by May 2010 were accessed from the Treasury (2011a). All the Treasury data were cross-referenced against the *Projects Database* of the UK government-supported private finance agency, Partnerships UK (2010).[65] The Treasury database is currently used by the Office for Budget Responsibility in order to calculate its estimate of PFI liabilities (2011a), while the PUK database has in the past been used in the preparation of PFI investment statistics by the Office for National Statistics (2008). In practice, there was substantial agreement on project details between the two sources but where discrepancies occurred the Treasury records were favoured, as these have been updated by officials more recently.

In addition, *Full Business Cases*[66] for 98 PFI projects that reached financial close between July 1997 and February 2010 were provided by the NHS organisations involved, following email requests by the author under the Freedom of Information Act (2000). While many of these documents were received in a heavily redacted form, with financial data removed on grounds of commercial confidentiality, these documents provided the following additional

[64] The Department of Health defines the term 'capital value' as the "costs of land, construction, equipment and professional fees but excluding Value Added Tax, rolled up interest and certain financing costs such as arrangement fees, bank due diligence fees, banks' lawyers' fees and third party equity costs" (Department of Health 2009). The figures here have been adjusted (by government) so that they are in a time-consistent price.
[65] As noted in Chapter 1 of this thesis, Partnerships UK is at the time of writing divesting itself of its businesses.
[66] As noted in Chapter 3, Full Business Cases are drawn up by authorities and their advisers prior to financial close. They provide details of the procurement process, economic appraisal, financial appraisal and the finally agreed contract price and output specification. Crucially, the ownership structure of the PFI SPV is recorded.

data: (i) the names of the equity investors involved in each project; (ii) the share of the total equity committed by each firm to that project; and (iii) the names of the senior debt providers involved in each project. For the remaining 25 schemes, these data were accessed from the *Projects Database* of Partnerships UK. In respect of equity providers, the data set is complete. For the senior debt market, the identity of the lead arranger was not available in the case of five projects, which represent 1% of the market as measured by capital value.

These data were used to calculate the market shares of each investor of equity and debt. In the industrial organisation literature, market share is most commonly measured according to industry sales, assets or employment data (Lipczinski *et al* 2005). It is evident that only the first of these provides an appropriate variable for analysis in the PFI market. As most of the investors involved in PFI are diversified across several distinct sectors of financial and other markets, the bulk of company assets and employees are utilised outside of the sector.

Sales was measured with respect to the *capital value* of PFI contracts to which investors have committed capital. This measure is used by the government for accounting purposes, and consists of an estimate of the value, at financial close, of the physical asset delivered (or to be delivered) under the PFI contract. This figure is different to both the total amount of capital raised by the private sector (a figure that would nearly always be higher), and the cost of constructing the asset (which would generally be lower). Capital value is not the only indicator of project size – for example, the value of equity and debt actually invested by an SPV's share- and debt-holders would be an appropriate substitute. However, capital value is used consistently by the Treasury, the Department of Health, the devolved administrations and Partnerships UK, and has been chosen on grounds of accessibility and comparability.

Market share has been calculated according to the following formula. The capital value of each project in which an investor is involved is multiplied by that investor's share, and the product is then related to the market total. To illustrate, if a project has a capital value of £100 million, and a given investor has a 50% share in the related SPV, the sum of £50 million is added to that investor's sales figure (i.e. 100 × 0.5 = 50). If the total capital value of the market in the relevant period is £1 billion, the firm's market share is calculated to be 5% (i.e. 50 million divided by 1000 million = 0.05). For senior debt providers, in the small number of cases where the data show that there are multiple providers involved on a project, representation is on a *pro rata* basis, as a detailed break-down is not available in most cases.

It is common for concentration to be measured according to annual figures (whether for sales or any other indicator) (Pepal *et al* 2005). However, due to the relative infrequency of sales in the PFI hospital sector, market shares have been calculated for three tri-annual periods (1997-1999; 2000-2002; and 2003-2005) and one five-year period (2006-2010), thereby disaggregating the projects into four groups that are roughly equal in number - though, as can be seen in Table 6.3 (overleaf) the average capital value of projects has increased significantly over the 14 year period. The decision to reject an annual analysis is intended to ensure that the number of projects used to measure the market is large enough to avoid skewing the share calculation. At the same time, it is important to disaggregate the projects in terms in order to capture the impact of changes in market structure over time.

Table 6.3 Number and capital value of projects in each period[i]			
Period	**Number of projects**	**Total capital value of projects (£m)**	**Average capital value of projects (£m)**
1997-1999	29	1819,5	62.74
2000-2002	30	1636	54.5
2003-2005	35	3479,1	107.12
2006-2010	29	5631	194.17
1997-2010	*123*	*12565,6*	*102.16*

[i] HM Treasury (2011a)

6.32 Selection of concentration measures

The n*-firm concentration ratio,* which measures the market share of the top n investment firms in the market (Pepall *et al* 2005), involves ranking all firms within the defined market by their market share. It is then possible to calculate the proportion of the industry's total production accounted for the largest firm, then the two largest combined, then the three largest, and so on. This produces a cumulative fraction of the industry's total capital value as firms with progressively smaller shares of the market are included (Pepall *et al* 2005).

Plotting this relationship yields a concentration curve, which provides an illustration of how market share is allocated across the industry. However, for evaluative purposes it is useful to summarise industrial structure with a single number or index. The n-firm concentration ratio (below) provides a single number which describes the market share of the top n firms.

$$\text{Concentration ratio} = \frac{\text{Sum of market shares for largest } n \text{ firms in the sector}}{\text{Total capital value of the sector}}$$

The n-firm concentration ratio has been widely used in studies of the determinants of market performance (Curry and George 1983; Sutton 1991) and is one of the approaches recommended by Hannah and Kay (1977) in a detailed evaluation of several concentration measures. The earliest work on the relationship between market structure and performance was undertaken by Mason (1939; 1949) and Bain (1951; 1956; 1959). For example, Bain (1951), examined concentration in US manufacturing industries over the period 1936-40, and found that industries with CR_8 scores above 70%, achieved significantly higher profitability than in those with CR_8 scores below 70%. These results have been used to support the claim that concentration facilitates collusion within markets and limits rivalry.

As discussed in Chapter 4, Bain’s findings were confirmed by numerous other studies. Bain's (1956) study extended his analyses to include the effects of both concentration and entry barriers on industry performance. Weiss (1974) undertook a detailed literature review of studies undertaken since Bain's seminal work up to the early 1970s. Overall, the majority of the studies analysed in this paper confirm the relationship between profitability and market structure - i.e. n-firm concentration as a statistically significant predictor of excess returns.[67]

In addition, changes in market shares over time give an indication of the dynamics of the market and are useful in assessing the nature and extent of market competitiveness. When considering such changes, UK competition authorities, for example, monitor market shares over several years (Competition Commission 2003). Volatile market shares may indicate the

[67] Indeed, as Weiss (1974) concluded: “The theory of concentrated markets unequivocally points to high prices and suggests high profit rates for dominant firms. Our massive efforts to test these predictions have, by and large, supported them. Altogether, there are plenty of reasons to believe, on both theoretical and empirical grounds, that high concentration ratios facilitate tacit or explicit collusion” (p. 231-32).

existence of effective competitive constraints against the exercise of market power in the form of, for example, successful entry, rivalry between firms and innovation. For this reason, a description of the volatility of market shares for CR_4 and CR_5 firms is included in Chapter 8.

An additional measure of concentration is the *Herfindahl Index* (HI), which has been used by the US Department of Justice to adjudicate on corporate merger cases. As the sum of the squares of all market shares in a sector, the HI weights each market share by itself (Pepall *et al* 2005). The effect of this is that a market in which the distribution of market share is asymmetric among the major players is, *ceteris paribus*, given a higher concentration score than a market in which there is a more equal distribution of sales among the dominant firms. This corresponds to some oligopoly models, in which a market with one dominant firm and three small firms is regarded to be more likely to result in excess profits than a market containing four dominant firms in which the share of sales is more equally divided (Kwoka 1985). In addition, the construction of the HI formula reflects the view of some economists that a large "industrial fringe" of small firms will increase the competitiveness of the market by offering a degree of *contestability* – i.e. the possibility that these firms may enter the market and challenge the market position of incumbent firms (Baumol *et al* 1982).

The formula for the HI is:

$$HI = \sum_{i=1}^{n} s_i^2$$

where s_i^2 is the market share of firm i in the market and n is the number of firms.

The capacity of the HI measure to predict the extent of departure of price (and the rate of return) from the competitive level has been called into question by a number of industrial organisation scholars (Weinstock 1982; Curry and George 1983; Michelini and Pickford 1985; Sleuwaegen and Dehandschutter 1986; Cortes 1998; Kwoka 1979). In addition, the key assumption underpinning the HI – that the asymmetry of market share drives market power, rather than concentration *per se* - remains controversial among theorists. As Scherer (1980) points out, mainstream microeconomic theory would indicate that pricing collusion among suppliers is facilitated by *equality* of market shares among dominant players, not *asymmetry*. To the extent this is correct (and the effect is not outweighed by other factors), the HI's emphasis on asymmetry is misplaced. Similarly, the concept of contestability that underpins the view that a competitive fringe of firms with small market share can often provide a real challenge to the market power of incumbents, is based on the assumption of ultra-low barriers to entry which many economists regard as problematic (Kwoka 1985).

Finally, the absence of clear benchmarks against which to assess HI greatly diminishes its utility for this thesis. As William G. Shepherd, an economist and former director of the anti-trust division at the US Ministry of Justice, states: “HI indexes have no real-world meaning or familiarity, nor any clear normative standards based on facts. Concrete information about market shares is replaced by abstractions” (2005, p.122). [68] In this thesis, the intention is to provide an analysis of the degree of concentration in the market for PFI contracts – one that is informed by microeconomic theory and regulatory principles, but is independent of any

[68] The Anti-Trust Division of the US Department of Justice, which uses the Herfindahl index to determine whether corporate mergers are in the public interest, considers Herfindahl indices between 1000 and 1800 to be *concentrated* and indices above 1800 to be *highly concentrated*. It is not clear, however, that an analytical framework that is applied to mergers is an appropriate basis on which to judged market power of incumbents.

one (contested) model of oligopoly. Consequently, while HI scores are recorded and discussed in Chapter 8, the CR_4 and CR_5 concentration ratios provide the focus of evaluation.

6.33 Selection of entry/exit and penetration measures

As discussed in Chapter 4, a firm with a large market share will not always be able to exert market power. Other features of the market, and in particular, the presence (or threatened presence) of new market entrants, will provide a degree of countervailing purchaser power, thus impacting on a firm's ability to set prices above the marginal cost of production (Bartelsman *et al* 2005; Competition Commission 2003). Therefore, in addition to concentration, it is important to consider the *dynamics* of the market, in terms of the number of firms entering and exiting the market – the process known as "churn" among economists and industrial organisation scholars (NIESR 2006; NERA 2004; Pepall *et al* 2005).

The most commonly used methods of measuring market entry and exit are identified in a systematic review of the empirical literature on churn, commissioned by the OECD (Ahn 2001). The dynamics of market structure have been summarised by a range of descriptive statistics, such as:

• *Entry rate*. This is typically defined as the number of firms entering the market between two periods, divided by the total number of firms within the industry in the first period, i.e.

$$\text{entry rate over period } x/y = \frac{\text{Number of entrants in period } y}{\text{Total number of firms in period } x}$$

• *Exit rate.* This is the number of firms exiting the market between two periods divided by the total number of firms in the first period, i.e.

$$\text{exit rate over period } x/y = \frac{\text{Number of exits between period } x \text{ and } y}{\text{Total number of firms in period } x}$$

• *Turnover rate*. This is the sum of the entry rate and exit rate over a given period, i.e.

$$\text{turnover rate in period } x/y = \text{entry rate} + \text{exit rate}$$

Following Geroski (1991), in his consideration of the rate of entry in UK manufacturing during the mid-1980s, it is suggested here that the gross number of entrants may overstate the importance of entry for the competitiveness of the market. Geroski argues that entry is likely to induce exit as the presence of new firms in a market may encourage the exit of established firms, such that the impact on the competitive environment is significantly reduced. A further measure considers exits as negative entries, and captures the overall change in an industry over a specified period. This *net* measure is considered by some economists to reveal more about changes in competition than measures of entry, exit and turnover (NIESR 2002). The formula for this measure, the *churn rate* (NERA 2004), is:

$$\text{churn rate in period } x/y = \frac{[\text{entrants in year } y] - [\text{exits from year } x]}{\text{Total number of firms in year } x}$$

Jeong and Masson (1991) note that there is no single correct measure for market dynamics since, “as a multifaceted phenomenon”, each measurement option captures a different facet of the structure. According to NIESR (2006), a *net entry* measure provides the most appropriate basis to examine the effect of entry on competition, especially in new markets. The churn rate is the net *increase* in the number of potential competitors. In accordance with this, the analysis in Chapter 8 focuses on churn as the indicator of market dynamism.

The chapter also considers the *entry penetration rate*, which measures the market shares of new entrants, and thereby weights the significance of entrants and exitors. This provides a method of measuring the degree of "competitive challenge" that is offered by the firms entering the market (NIESR 2006). Studies have shown that the average size of firms entering the market is often much smaller than that of established firms, such that the competitive challenge they provide may be less than the churn rate suggests (Geroski 1991).

6.34 Data collection: the procurement process

Data on the length of the procurement process have been accessed from the *Projects Database* of Partnerships UK, while more detailed information has been sourced from the 98 Full Business Cases accessed under the Freedom of Information Act. As discussed further below, three features of the procurement process provide the focus of measurement and analysis: (1) *barriers to market entry*; (2) *the number of consortiums involved in the competitive stage of bidding* and (3) *the extent of exclusive bargaining*. In relation to *barriers to entry*, the absence of comprehensive data on bidders' development costs requires the use of proxy indicators, in this case the length of the procurement process (and specifically the length of the preferred bidder stage) along with advisory costs of the NHS purchaser. The only systematic analysis of the magnitude and determinants of transaction costs in private finance initiatives in the UK (Dudkin and Välilä (2005) found, using data from internal (and unpublished) European Investment Bank documents, that the costs of negotiation were roughly equal between the purchaser and the winning bidder. This indicates that the magnitude of the advisory costs to the NHS purchaser is a reasonable proxy for the costs to the successful bidder (though the costs to the overall bidding field will, of course, be higher).

Data on the overall length of the procurement process is populated by information from the PUK *Projects Database*, which provides the relevant data for 107 of the 123 schemes. The FBCs provide more detailed data on the length of *each phase* of procurement for 61 schemes (out of 98 FBCs received). *The number of bidders during the competitive phase of procurement* is assessed against the number of bidders at specific phases in the process (described in sections below) – which is populated with information contained in 56 FBCs.

Finally, the *extent of exclusive bargaining* is explored through a data set provided to the author by the National Audit Office (2010b), relating to 15 NHS PFI projects that reached financial close between 2003 and 2006. This provides the following quantitative data: (1) the value, in monetary terms, of the change in the output specification between the point of preferred bidder selection and the point of financial close; (2) the value of this change as a percentage of the unitary charge estimated at the point of preferred bidder selection; and (3) the increase in the length of the concession period. These three variables are used to explore the extent to which the project is redefined during this phase of negotiation. These data were provided in response to an FOI Act request to the National Audit Office (2010b).

6.4 Limitations

The sources of data used to measure returns contain projections of costs and revenues, as estimated by Special Purpose Vehicles and their financial advisers at the time of financial close. They contain the *expected value* of future cash-flows, rather than their *actual value*. Insufficient data is available on actual cash flows for these contracts to estimate whether the projected returns are likely to be matched by the actual returns (and the approach of the Information Commissioner's Office in terms of financial models indicates that such data are likely to be regarded as commercially confidential for many years to come). However, the impact of this limitation on the analysis is not as significant as it may appear, for two reasons. First, the relevant objective of this thesis is to evaluate the returns that private investors modelled at the time of financial close against their costs of capital. These cost of capital benchmarks are modelled on the basis that actual values may differ from those expected – which is the definition of risk provided in section 4.4 of this thesis. From this perspective, the values projected in financial models are the *only* appropriate type of data.

In addition, it is reasonable to assume that the cash flows projected in financial models will accord to a substantial degree with those actually received. The discussion in Chapter 4 illustrates that the extent to which SPV costs and revenues are to a large extent fixed or at least determinable with reference to the contract. Estimates of those items of project costs on which an SPV is exposed to future variation – e.g. insurance costs, office and management costs, and provisions for long-term maintenance and asset replacement - are generally recorded in the models as *expected values* (so that mean values are recorded in the models from values across the range of possible outcomes). In addition, while revenues may vary with inflation, this reflects changes in the operational costs of a project, such that above-projected changes in inflation have minimal effect on nominal returns. Below-projected changes in inflation are hedged against through RPI swaps (Yescombe 2008).

However, there is one caveat here. While it is clear from the discussion in Chapter 3 that the risk faced by project investors is limited on the “downside” (i.e. the extent to which returns can be *lower* than projected), empirical research shows that cash-flows relating to PFI contracts may sometimes be *greater* than has been projected at the time of financial close, such that there may be a considerable degree of risk on the “upside” (Shaoul *et al* 2008).

If, for instance, construction is completed ahead of schedule, or if maintenance costs in the early years of the contract are over-estimated *ex ante,* returns may potentially exceed those projected. Maintenance is the main function performed by PFI contractors once the buildings are completed, and is provided on a monopoly basis – normally by the investor companies themselves – throughout the whole contractual period. On many PFI projects signed by the NHS, projections of maintenance expenditure made at the point that contracts were signed have proved to be excessive (National Audit Office 2010a). In turn, this has meant that the charges being paid by public authorities are much higher than is necessary to reimburse PFI providers for their ongoing maintenance costs. Currently, the resulting surpluses flow directly to equity investors as the owners of the project, so there may be a systematic tendency, *ceteris paribus*, for actual returns to exceed those projected.

In addition, a cost of capital benchmark that is lower than the appropriate rate for the degree of risk to which cash flows are subject will lead to an injudiciously inflated estimate of the excess return. This will also falsely inflate the equivalent BCR, as the effect of discounting will be lower than is appropriate, inflating the present value of projected income in relation to the initial investment. As discussed in the analytical approach outlined in Chapter 7, an attempt has been made to reduce the impact of this potential limitation by utilising cost of capital benchmarks that, as far as possible in the context of limited access to commercial data, are based on the risk assessments of leading PFI investors themselves.

It has been assumed that the discount rates cited in the annual financial reports of investors are a reliable source of data for these assessments. However, there is a possibility that investors do not record these accurately and that the inaccuracy is systematically weighted towards under- or over-estimation. For example, it could be argued that firms have an incentive to cite inappropriately low discount rates in order to produce an injudiciously high portfolio valuation, or, alternatively, that companies are subject to *optimism bias* – a systematic tendency to undervalue the amount of risk involved in projects. While company assessments are subject to scrutiny by independent financial advisers, the information available to auditors may be imperfect and/ or asymmetric in terms of the degree of risk. Therefore, while every effort has been made to secure a wide range of sources for the estimates of risk premia (incorporating data from 10 major investors), the possibility that the cost of capital benchmarks are inaccurate due to systematic bias cannot be excluded.

A further limitation of this study concerns the focus on returns to investors – i.e. the fact that the return to subcontractors is outside the scope of the study. As noted by Shaoul *et al* (2008), the complex PFI structure creates the possibility of *transfer pricing*, whereby returns are projected to accrue to the subcontractor, rather than the SPV (and thereby remain invisible in the calculation of investor returns). There may be an incentive for contractors to structure things this way, in order to obscure this higher return in financial models (which do not disaggregate construction and operational prices into cost and profit components).

There is empirical evidence that higher profit margins are expected in construction contracts operated through PFI structures relative to non-PFI structures. For example, the House of Commons Public Account Committee stated (2003): "In 2000 Carillion plc [a major PFI contractor and investor] said that it expected higher construction profits on PFI work and had been achieving a profit margin of 2.7% against turnover while in 2001, the Kier Group said it had made returns of 2.5% of turnover compared with 1% on other contracts (p.7). It is evident that research on this topic is desirable in order to elicit a more complete account of the cost efficiency of the PFI capital structure, but this is outside the scope of this thesis.

In relation to the methods for measuring market structure, one limitation is that, by using *ex post* data to evaluate presence in the market and market share, this analysis precludes examination of providers of finance who have bid unsuccessfully for projects. In other words, the descriptions and analyses presented below centre on the "effective competitors" in the market (NIESR 2006). This may be seen as problematic in terms of the assessment of entry/exit dynamics in particular, as it is likely that some bidders, though unsuccessful, will have impacted to some extent on the competitive environment. Given the absence of comprehensive data, the focus on effective competitors is probably unavoidable. There are, in addition, clear advantages to focusing on those players in the market that have provided the greatest competitive challenge. Future research might address this limitation by providing an analysis based on all market entrants (i.e. all firms which have been involved in procurements) rather than focusing exclusively on those that have been successful.

Finally, as noted above, the *extent of exclusive bargaining* is explored through a data set that provides quantitative data relating to: (1) the value of the change in output specification between the point of preferred bidder selection and the point of financial close; (2) the value of this change as a percentage of the unitary charge estimated at the point of preferred bidder selection; and (3) the increase in the length of the concession period. These three variables are used to explore the extent to which the project is redefined during this phase of negotiation. These data were provided to the author in response to FOI Act request to the National Audit Office (2010b). It is evident that a broader sample of schemes – and in particular a sample which includes projects which were signed over a broader period of time - would enhance the reliability of this element of the study.

6.5 Conclusion

This chapter has described and explained the methods utilised in collecting and analysing data in respect of the two substantive empirical components of this thesis, namely: the evaluation of the returns projected (at the point of contract signature) to PFI investors with reference to the amount of risk to which the relevant returns are subject; and the analysis of the sources of any identified excess returns through an examination of the *structure* and *competitiveness* of the markets for equity and debt. Specifically, the methods for measuring investor returns, market concentration, entry/exit dynamics and the competitiveness of the procurement process have been identified and explained. In the subsequent two chapters, the analytical approaches to evaluating these outputs are outlined in detail, along with the presentation of results. Suggestions for future research projects stemming from the discussion of methodological limitations above are contained in Chapter 9 of this thesis.

7. Evaluating the return to investors

7.1 Introduction

This chapter outlines an approach to evaluating investor returns and applies this to projected cash flows contained in the financial models of 11 PFI projects commissioned by NHS organisations in England and Scotland. Cost of capital benchmarks are constructed in accordance with the theoretical framework outlined in Chapter 4, and these are used as (1) comparators to evaluate Internal Rates of Return on Free Cash Flow to Blended Equity and Free Cash Flow to the Project, and (2) as discount rates to calculate the equivalent Benefit-Cost Ratios. Using both the IRR and BCR criteria, returns to investors on this group of PFI projects are shown to be higher than would be sufficient to remunerate investors for the risk they bear, such that in each case the return to investors contains an excess premium.

7.2 Approach to the analysis

As noted in Chapter 4, financial economics dictates that the degree of risk involved in an investment determines the fair return (Hirshleifer 1958). In financial theory and practice, the required return is known as the *cost of capital*. This is an *opportunity cost* concept which recognises that funds (broadly, equity and debt) used to provide capital assets have other potential uses in the economy, and holders of such funds will only invest if the return they expect to earn exceeds the market price of the risk involved in doing so (Sloan *et al* 1988). In other words, the cost of capital - for equity, debt or a combination of the two - is the minimum rate of return that an asset or project must, *ex ante*, be projected to provide in order to secure investment (Sharpe 1964; Lintner 1965). The cost of capital for a firm or an investment is determined by the amount of risk it involves and the market price of that risk. As discussed in sections below, the cost of capital can be used as a *benchmark* with which to compare the Internal Rate of Return accruing to an investment, and as a *discount rate* to calculate alternative measures of return such as *Net Present Values* and *Benefit-Cost Ratios*.

7.21 The benchmark cost of blended equity

In accordance with the above, and drawing on the theoretical discussion in section 4.4, the benchmark cost of blended equity for a PFI investment is defined in this thesis as the expected return on assets in the equity market with equivalent risk. This is the appropriate method for calculating the cost of capital benchmark for each project, thereby enabling the projected Blended Equity IRR to be evaluated and the Blended Equity BCR to be derived.

In Chapter 3, it is shown that the bulk of project-specific risk – relating to both cost and revenue - is borne by subcontractors in a PFI hospital project. While an element of risk is retained by SPV investors, due to the capping of subcontractor liabilities and the cost-plus nature of the lifecycle maintenance subcontract, the probability that *ex post* returns will vary from those projected *ex ante* is low relative to other asset classes. This is significant when considering the returns that are required by investors. Since the bulk of projects risks are contractually allocated away from the SPV, and therefore away from investors of blended equity, an SPV should not include a premium for these risks in its expected return.

Indeed, as noted in Chapter 4, modern finance theory determines that *any* premium for project-specific risks is unwarranted. The small element of project-specific risk borne by SPV investors should on this account attract no additional premium on the required return, since this risk can be spread by its member companies through the diversification of their portfolios, such that overall portfolio returns are not affected (Copeland *et al* 2005; Brealey *et al* 2008; Sharpe 1964; Lintner 1965). On this view, only risks that are systematic, in the sense of being correlated with the market portfolio such that all investments are exposed, require a premium. As Grout (1997) states: "it is the correlation of (or covariance between) returns from the asset with the returns on the overall market portfolio that determines the equilibrium return on an asset. This is the price of risk in a competitive market" (p.59).

As outlined in section 4.4, this view of the risk-return relationship is formalised in the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965), which is much the most common model used by investors in equity markets globally (Graham and Harvey 2002). The CAPM determines that the return required on any given investment - i.e. the return that an investment must generate in order to attract capital from the markets - is a function of the rate of return available on risk-free investments (*the risk-free rate*) plus a premium for the amount of systematic risk that making the investment involves (*the equity risk premium*).

In corporate finance practice, the *risk free rate* is normally referenced to the Internal Rate of Return on fixed income securities issued by the relevant government. This rate of return – in the UK, the *gross redemption yield on government gilts* - is taken to be a benchmark for the return required by the market on a riskless asset (Hillier *et al* 2010). In principle, a risk-free security must involve no uncertainty about the solvency of the sovereign counterparty, and its ability (and willingness) to make scheduled payments of debt principal and interest (Damoradan 2009). Thus, securities issued by corporations are not risk-free, as even the largest firm may declare bankruptcy and thereby fail to meet its debt commitments. In contrast, securities issued by a government in a jurisdiction with its own central bank are typically considered to involve less default risk than all other securities in that jurisdiction. As these governments have the power to print money to pay off debts, gilt-holders can be confident they will receive the expected return on their investment (in nominal terms).[69]

The equity risk premium is the *equilibrium* price of risk (Grout 2005). It is the premium necessary to persuade investors in a competitive market to hold the risk of the investment (see section 4.4). Under the CAPM, the equity risk premium is arrived at by multiplying:

• the β of the investment – i.e. the weighted covariance of the projected excess return on the investment with the average excess return on the market as a whole; by

• the *Equity Market Risk Premium* (EMRP) – i.e. the average excess return on the equity market, reflecting the market's view of the risk inherent in the equity market as a whole.

To clarify, if the variance (i.e. risk) of a given investment is perfectly correlated with that of market portfolio (e.g. the FTSE 500), β is 1 and the required return on an asset valued using the CAPM is equal to the required return on the equity market as a whole (the market portfolio). Conversely, if there is no correlation between the risk outlook for an investment and that of the market portfolio, β is 0 and the required return is the observed market rate on a risk-free security. It should be noted that an investment with a β of 0 may still involve a substantial quantum of project-specific risk (i.e. actual returns may be likely to vary significantly from those projected at the time of the investment). However, as long as the

[69] Conventional gilts do not guarantee a real return and are therefore subject to inflation risk. Indeed, market expectations about the inflation rate will often drive the size of the rate of return on gilts (Hillier *et al* 2010). Where currency is printed to pay government debt-holders, this may, *ceteris paribus,* lead to higher inflation.

expected variance is uncorrelated with the expected variance of the market portfolio, the probability of such variation will not attract a premium under CAPM (Brealey *et al* 2008).[70]

The CAPM is the dominant capital budgeting technique used by corporate financial managers internationally (Graham and Harvey 2002). As such, it is the appropriate basis for calculating the cost of blended equity benchmarks in the following analysis. Below, the risk-free rate for each project is defined as the average gross redemption yield on long-dated UK government gilts (specifically, the weighted average gross yield of gilts with 15-year, 20-year, 25-year and 30-year maturities) issued in the year that the project reached financial close. This has been calculated using the daily yield averages as recorded in a database compiled by the government's Debt Management Office (Debt Management Office 2010).[71]

However, calculating the risk premium element of the cost of blended equity benchmarks for a PFI investment requires a number of derogations from the standard CAPM approach outlined above. Below, the three reasons for these derogations are explained in detail.

(1). Estimating the EMRP. There is disagreement among theorists and practitioners about the correct method for deriving EMRP. The approach most commonly advocated in corporate finance literature (and used in practice by investors) is to use the arithmetic mean

[70] β can be negative where returns are inversely-related to the return on the market portfolio and they can be greater than 1 where the return on an investment is influenced disproportionately by factors impacting on the market portfolio. Gold is a negative β investment because its price tends to rise when the stock market falls. In contrast, assets in sectors such as construction may have a β higher than 1 due to their above-average sensitivity to changes in the economic context - their prices rise or fall more than the market average.

[71] The long-dated gilt yield figures are aggregated by the Debt Management Office from the yields of more specific maturities (the 15-year, 20-year, 25-year and 30-year gilt yields noted). It could be argued that more specific maturities should be the basis of calculating the discount rates for this analysis. For example, the 25-year or 30-year gilts might have been used as the benchmark risk-free rate, thereby matching the maturity of the investment. The decision to use instead the aggregated long-dated yield has been taken on the grounds that different investors are likely to use different maturities. The aggregated yield therefore provides a reasonable approximation of the market average. The impact on the discount rate of using the aggregated yield rather than 20-year, 25-year and 30-year maturities, is typically very small and in all cases less than 0.2%.

of historical returns on the equity market (Brealey *et al* 2008). However, there is disagreement about the validity of the historical returns method, the method of averaging,[72] and the legitimacy of averages derived from any specific time period (Damoradan 2009).

The result is that different experts and practitioners advocate different reference premia. For example, Solomons and Grootveld (2003) record the EMRP of the UK as 4.41%, using historical returns on equity investments data covering the period 1976-2001. In contrast, PricewaterhouseCoopers' UK Economics Advisory Services use an Equity Market Risk Premium of 5%, based on forecast figures derived from surveys of investor expectations in addition to comparatively recent equity returns data (PricewaterhouseCoopers and Franks 2002). Meanwhile, in the UK, most economic regulators and the Competition Commission use an EMRP of 4% (ibid). Given this heterogeneity in estimation methods, it is likely that different investors in the PFI market utilising the CAPM will determine their required returns on the basis of different estimates of EMRP, albeit most likely within a range of 4% to 5%.

2. Deriving β. Blended equity on a PFI hospital project is provided by the owners of SPVs, which are entirely new businesses established with a specific remit to deliver the PFI contract and earn income from the revenues it generates. As a result, there are no historical data regarding dividends or share price movements for SPVs, and therefore no directly observable market data on which to base β. Adapting the CAPM to cope with businesses with no historical performance data is a complex process, and is dependent on β data from industries or companies that bear a similar level of systematic risk to those of PFI projects.

[72] Substituting the geometric mean for the arithmetic mean reduces EMRP by a fraction of a percentage point.

One method has already been mentioned in Chapter 5 – namely, to use historical returns data drawn from UK utilities that are subject to the RPI−X regulatory framework (PricewaterhouseCoopers and Franks 2002). As noted, these are industries that have characteristics in common with PFI projects, including the presence of large initial capital investments, low-to-negligible demand risk, relatively predictable costs and long-term planning horizons (Yescombe 2008). On this basis, PricewaterhouseCoopers and Franks (2002) suggested a benchmark asset β of 0.38 to 0.5 for the cost of equity, implying that the level of risk faced by SPVs is up to half of that of the equity market average. With an EMRP of 4% to 5% (as above), this suggests a risk premium within the range 1.5% and 2.5%.

Another option is to consider the β of infrastructure funds (i.e. institutions that commit equity to a diverse array of infrastructure projects) listed on the FTSE All-Share Index. Of these funds, a small minority are concerned principally or exclusively with PFI projects (Thomson Datastream 2010). An example of such a fund is International Public Partnerships, which, as of 31 March 2010, has a portfolio of 51 PFI/PPP projects in the UK, Europe, Australia and Canada, mostly in the transport, education, health care, judicial and police sectors (International Public Partnerships 2010).[73] In its 2010 prospectus, it noted several advantages to equity investments in these sectors (in a risk analysis that agrees substantially with that presented in Chapter 4), including: (a) "predictable yields, which are attractive relative to the asset risk profile"; (b) "the solid creditworthy nature of counterparties [i.e. public sector authorities]"; (c) "the ability to transfer project related risks, including construction and operational risks to subcontractors"; (d) "the low exposure to changes in

[73] Although active in health care PFIs in the UK, and PPPs overseas, the International Public Partnerships Fund is not an active participant in the mainstream UK PFI hospitals market. Its discount rates have therefore not been used in the construction of benchmark equity risk premia in the analysis that follows.

the economic cycle”; and (e) “the low correlation [of returns] to other investment classes, e.g. property or other equity classes” (International Public Partnerships 2010, p.2).

From a CAPM perspective, the last advantage is the most important. This suggests the correlation between returns on the fund and those of the market as a whole would be low. The *Thomson Datastream* database records a β for the fund of 0.3 against returns on the FTSE-All Share Index over the period from the fund’s listing in November 2006 to April 2010 (Thomson Datastream 2010). Assuming an EMRP of 4% to 5%, this means an equity risk premium of 1.2% to 1.5% - lower than the estimate of PricewaterhouseCoopers and Franks.

Senior practitioners involved in PFI have suggested that “for equity investors, PFI is perceived as a relatively low-risk investment. It is backed by government covenant, provides a stable long-term yield and many of the risks are sub-contracted. Unlike other areas of project finance, PFI has limited exposure to market risks” (Ryan *et al* 2006). Given this view, which is consistent with the description of both project-specific and systematic risks presented in Chapter 4 of this thesis, the modest β figures suggested by the analyses above appear reasonable. However, it is clear that, as with the Equity Market Risk Premium, the calculation of the β requires a number of assumptions to be made in respect of the sectors to be used as proxies and the time period over which the reference data is selected. Ultimately, the exercise relies on subjective judgement and investors are likely to take different views about the validity of any single cost of capital benchmark that is suggested.

3. Portfolio diversification in the PFI market. The applicability of the standard CAPM is not clear cut. There is, generally, a view among financial economists that even if the orthodox CAPM is the most *rational* approach to calculating required returns, it may not be an accurate description of real decision-making among financial practitioners (Mehra and Prescott 1985; Fama and French 1992; Dimson *et al* 2002). As noted above, the formal CAPM assumes that the investor has a well-diversified portfolio, such that variation in the return on individual assets has a negligible impact on returns. This may well be an accurate depiction of the reality in many sectors of the capital market, but in the PFI context it is questionable. As noted in Chapter 8, many equity investors in the sector are infrastructure, or even PFI, specialists. Where, contrary to the core assumption of the CAPM, an investor's portfolio is not well-diversified, it may require an additional premium for project-specific risk. In financial economics, it is generally understood that, where markets are segmented and investors specialised, project-specific risk might raise the cost of capital (Merton 1987).

A final consideration stems from the concepts of agency frictions, information asymmetries and risk aversion, as applied in financial economics (Shleifer and Vishny 1999). While a management team responsible for providing equity finance will be rewarded if the project exceeds expectations, it may be more than proportionally penalised if it falls short (Spackman 2001). Thus, as Arrow[N] and Lind (1970) comment, from the perspective of individuals' careers and income, variations in the returns on specific investments may matter greatly even if, from the shareholders' point of view, such risks should be ignored.

Given the degree of subjectivity involved in deriving an appropriate equity risk premium, the method advanced here is to derive this according to the blended equity discount rates that are *actually used* by major PFI investors themselves. The data for this exercise come from the annual financial reports of 10 major investors of blended equity in PFI hospitals projects. Between them, the selected firms have investments representing 37.5% of the total value of the blended equity market in PFI hospitals.[74] In order to provide a valuation for their PFI portfolios, financial managers at these 10 firms use project-specific discount rates to provide a valuation of the future expected blended equity cash-flows as projected in financial models. These rates have in each case been constructed on the basis of adding to the risk-free rate an ERP, in accordance with the CAPM as outlined above.[75] The average of these project-specific rates are recorded in the Annual Reports and Accounts published by these companies in recent years.[76] By subtracting from these average rates the relevant long-dated gilt yield (as described above), the average ERP estimated by investors is derived.

As shown in Table 7.1 (overleaf), the ERP used by investors in constructing discount rates varies to some extent between firms and also over time. This is likely to reflect both the inevitable heterogeneity in risk premium estimation methods, as detailed above, and also the fact that firms have different combinations of risks and opportunities associated with their projected earnings (e.g. in terms of the predictability and covenant of the income from operating concessions). Further, if it is assumed that investors will require an additional premium for project-specific risk, contrary to the CAPM but reflecting an imperfect degree of portolio diversification or agency frictions, then different combinations of projects in different phases of development (e.g. construction, ramp-up, operation etc) may be

[74] See Chapter 8 for comprehensive details of how the market definition and these percentages are defined.
[75] John Laing plc was the first firm in the PFI market to provide a discount rate methodology in its annual reports. Prior to 2002, Laing used its own corporate Weighted Average Cost of Capital as a base discount rate, to which it added further risk premia according to project stage and type (John Laing 2003). This approach conflicts with the prescriptions of corporate finance theory, which dictates that only projects with the same risk profile as the business itself can have the same WACC (Yescombe 2008). From 2006, John Laing adopted a more orthodox CAPM-based method referenced to the gilt rate. John Laing explains in its 2006 report that the use of this method would have resulted in a reduction in the discount rate of 3.7% in 2005, to 2.56%. As John Laing's 2002-2005 approach appears in to be in conflict with the logic of the CAPM and indeed corporate finance more generally, the related rates are italicised in Table 5.4, and are excluded from the analysis below.
[76] Amec and Serco ceased to do this, from 2007 and 2003 respectively, having withdrawn from the market. In addition, the PFI Infrastructure Company was acquired by the Merchant Bank Quayle Munro in 2007.

regarded by financial managers as representing different levels of risk. For example, a firm which has a high proportion of its projects in the construction phase may use a higher average discount rate than a firm with a high proportion of projects in mature operation.[77]

Table 7.1 Risk premia used by PFI equity investors in portfolio valuation (2002 to 2010)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Market share
Gilt rate	***4.68%***	***4.6%***	***4.66%***	***4.34%***	***4.11%***	***4.49%***	***4.42%***	***4.3%***	***4.3%***	
COMPANY										
AMEC PLC	-	-	5.84%	6.06%	4.99%	-	-	-	**-**	1.4%
Balfour Beatty	-	-	-	5.36%	5.39%	5.01%	4.98%	5.1%	**5.1%**	7.5%
Carillion	-	-	-	5.56%	3.89%	3.51%	4.58%	4.7%	**4.7%**	4.4%
Costain	-	-	-	-	-	-	3.58%	3.7%	**3.7%**	0.6%
HICL	-	-	-	-	-	2.51%	2.98%	4%	**4.4%**	7.8%
John Laing	*5.82%*	*6.2%*	*5.94%*	*6.26%*	3.09%	2.81%	2.98%	3.6%	**4.2%**	7.8%
Kier Group	-	-	-	-	-	2.51%	2.58%	3.7%	**3.2%**	0.7%
PFI Infra Co	-	-	-	4.96%	4.39%	-	-	-	**-**	0.5%
Serco	-	3.90%	-	-	-	-	-	-	**-**	0.1%
Skanska	-	-	-	5.66%	4.89%	4.51%	5.08%	5.2%	**5.2%**	6.7%
Average/Total	***5.82%***	***5.05%***	***5.89%***	***5.51%***	**4.44%**	**3.48%**	**3.82%**	**4.29%**	**4.36%**	**37.5%**

Sources: These data are drawn from the annual financial reports of: AMEC plc (2004-2006); Balfour Beatty (2003- 2010); Carillion (2008-2010); Costain (2008-2010); HICL (2007-2010); John Laing (2003-2010); Kier Group plc (2007-2010); The PFI Infrastructure Company (2005-2010); Serco (2003); Skanska (2005-2010).

On the basis of these discount rates, it appears that the appropriate premium on PFI equity lies between 2.5% and 6%. This is a higher range than can be rationalised by the level of systematic risk alone which, as noted, would suggest that 2.5% would be at the *upper* and

[77] An account of the process of arriving at "fair value" is provided in one 2010 annual report (HICL 2010, p.13): "Fair value for each investment is derived from the present value of the investment's expected future cash flows, using reasonable assumptions and forecasts and an appropriate discount rate. We exercise our judgment in assessing the expected future cash flows from each investment based on the detailed concession life financial models produced by each Project Company. The discount rates used for valuing each PFI/PPP investment are based on the appropriate risk free rate (derived from the relevant government bond or gilt) and a risk premium... We use our judgement in arriving at the appropriate discount rate. This is based on our knowledge of the market, taking into account intelligence gained from bidding activities [and] discussions with financial advisers in the appropriate market and publicly available information on relevant transactions."

not the *lower* end of the range. An equity premium of 6% suggests a level of risk that is at least 1% higher than most estimates of the average for the equity market as a whole (i.e. implying a β greater than 1). Given the low level of exposure to market risks, this appears implausible and appears to bear out the suggestion above that PFI investors may take into account all sources of variability around expected returns, not just the systematic element.

If that is the case, rational investors will require an additional premium for the (limited) amount of project-specific risk that they bear on individual contracts - for example, the risk that life-cycle maintenance costs may be higher than projected. It is therefore assumed that this range in risk premiums, by virtue of its origin in the views of PFI equity investors themselves, provides the appropriate basis on which to construct the cost of blended equity benchmarks. That said, the difference between this result and that which would have been generated by application of the standard CAPM indicates that the benchmarks are conservative, in the sense that they will minimise the scale of the excess return identified.

In addition, some modification of the risk premium range is necessary. The premiums in Table 7.1 are higher than the average premium actually applied by firms in discounting the projected cash-flows relating to *hospital* PFI schemes. As noted, these figures reflect the *average* discount rates used across an investor's portfolio of projects – portfolios that in most cases include schemes in many different categories of infrastructure. For example, the discount rate quoted by Carillion in its 2009 annual report (9%) is the average of 23 specific discount rates, of which three are applied to "shadow toll" road projects. By virtue of their volume-based payment mechanisms (i.e. the fact that the cash-flows will vary to some extent in accordance with the usage of the facilities), these assets present a higher level of market risk than would obtain on a PFI hospital, and therefore require a higher discount rate in valuation.[78] Similarly, AMEC's discount rate in 2006 (9.1%) is an average of the rates applied to PFI projects, four of which are roads deals incorporating a volume-based payment mechanism. As a result, the range of equity risk premiums to be applied to the risk-free rate in this analysis is moderated slightly at the upper end, giving a range of 2.5% to 5.5%. Table 7.2 (overleaf) shows the cost of blended equity benchmarks for each project on this basis.

[78] The distinction between PFI assets that are *availability-based* and *volume-based* is made succinctly in the 2005 annual report of Skanska (2005, p.32). "In the availability model, compensation is based on providing a given amenity and agreed services at a predetermined price. Compensation is payable regardless of the extent to which the facility is utilised. The project company is exclusively responsible for keeping the services and the facilities available, functioning smoothly and up to the agreed standard. Divergences from this standard may result in a limited deduction from payments. The compensation is adjusted for inflation. Because the customer is usually a national or local government, the project company's credit and payment risk is low. Meanwhile the potential for a higher return is limited...In the market risk model, compensation is based entirely on end-user fees, for example tolls collected from motorists on a stretch of road. The market risk model implied (sic) that the owner has bought the rights to the revenue from a given facility during the agreed period, usually 25-35 years. In this case, the project company's credit and payment risks are substantially higher, while it also has major potential for increasing the return on its investment as a consequence of increased use of the amenity."

Table 7.2 Risk-free rates and cost of blended equity benchmarks for the 11 data set PFI projects			
Project	**Risk free rate**[i]	**Cost of blended equity (lower risk premium)**	**Cost of blended equity (higher risk premium)**
North Cumbria Cumberland Infirmary rebuild	5.29%	7.79%	10.79%
Norfolk/Norwich Acute hospital rebuild	5.1%	7.6%	10.6%
Durham and Darlington General Hospital rebuild	5.1%	7.6%	10.6%
NHS Lanarkshire Hairmyres Hospital rebuild	5.1%	7.6%	10.6%
NHS Lanarkshire Law hospital rebuild (Wishaw)	5.1%	7.6%	10.6%
NHS Lothian Royal Infirmary of Edinburgh	5.1%	7.6%	10.6%
Nottingham University Queen's Medical Centre	4.58%	7.08%	10.08%
East/North Hertfordshire Herts and Essex hospital	4.48%	6.98%	9.98%
Hull/ East Yorks Hospitals Castle Hill hospital rebuild	4.6%	7.1%	10.1%
Sandwell/West Birm'm Ambulatory care centre	4.68%	7.18%	10.18%
Hull/ East Yorks Hospitals Oncology wing development	4.11%	6.61%	9.61%

[i] Debt Management Office (2010)

7.22 The benchmark cost of debt

The financing of a PFI project involves debt as well as blended equity. Thus, the overall benchmark cost of capital on a PFI project is a blend of the benchmark cost of debt (i.e. the expected interest rate) and the benchmark cost of blended equity (i.e. the expected return on equity assets of equivalent risk) (Brealey *et al* 2008). In fact, because SPVs have a capital structure that is highly dependent on senior debt, the debt interest rate is the most significant determinant of the overall financial cost of a PFI and consequently one of the most important contributors to the unitary charge. In the data set of 11 PFI projects, the average ratio of senior debt to other forms of finance is 88/12.[79] In addition, because of the high ratio of senior debt to blended equity, the transfer of interest rate risk to the lender is

[79] See Chapter 6. This is somewhat below the mean ratio of the 54 projects for which FBCs provide data on the financial gearing ratio. For these schemes, the mean ratio of debt to equity is 92.7% (with a range 79% to 98%).

an important element of the SPV's risk management procedures (Yescombe 2008). Thus, PFI project companies typically attempt to fix their interest rate on senior debt at the time of financial close. The manner in which the interest rate is fixed varies depending on whether a project is bank financed or bond financed. The constituent elements of the interest rate on senior debt also differ somewhat between the two forms of debt finance, as outlined below.

The rate at which the interest on **bank finance** is fixed is a product of three variables (HM Treasury 2007a):

(1). The long-dated swap rate. A "swap" is an agreement between two parties to swap interest rate payments, such that one is paying a fixed interest rate and the other a floating rate. The swap rate is the underlying cost of fixed-rate financing for the payment period. The interest rate swap market is used to change the basis on which interest is paid on an asset or liability. For SPVs involved in a PFI project, the floating rate they are offered by the bank is turned into a fixed rate – typically by the same bank (Yescombe 2008). The fixed interest part of the swap will be related to the rates of return available on the gilt market.

(2). The swap credit premium. This is a small fee, usually expressed in basis points (i.e. one hundredth of a percentage point), set to reflect the risk to the bank of conducting the swap.

(3). The credit margin. This is the additional interest rate risk premium levied by the bank above the swap rate and the swap premium, and is usually expressed in basis points. As discussed in Chapters 3 and 4, this margin will in theory be set to reflect the magnitude of *credit default risk* that is associated with lending to the specific SPV and the specific scheme.

In contrast, the rate at which the interest on **bond financing** is fixed is a function of two variables:

(1). The "comparable" gilt rate. This is the interest rate which would be payable on the government gilt of the same maturity, and is determined by conditions in the gilt market.

(2). The bond margin. This is the equivalent of the "credit margin" on bank finance, and reflects the premium that bond investors require for taking on the credit default risk. As a result, the bond margin is substantially determined by the credit rating of the transaction.

The rates of interest on swaps and gilts (conventionally known as the "base rates" for project finance loans (Yescombe 2008) are driven by market expectations about changes in the level of inflation over the borrowing period. As a result, they tend to be similar. For example, from 1998 to September 2008 (i.e. the onset of the financial crisis), the 25-year swap rate tracked the equivalent UK government gilt rate at a premium ranging between 0.2% and 0.6% (National Audit Office 2009a). As base rates are priced by the international capital markets (rather than the institutions within the PFI debt market), the individual senior lender on a project normally has little discretion over these rates. In the context of swaps and gilts, the senior lender is therefore a price-*taker*, as opposed to a price-*maker*. Accordingly, in calculating the cost of debt benchmarks in the analysis that follows, the base rates *recorded in the financial model of each project* are taken as the appropriate base rates.

However, the premiums and margins that are added to the base rates *are* influenced by the structure and competitiveness of the PFI debt market, and it is important to evaluate these against appropriate (i.e. risk-based) benchmarks.[80] Taking first the credit premium to be applied to the swap rate, PricewaterhouseCoopers and Franks (2002, p.26) has described a "typical" credit premium (on the basis of 64 PFI financial models analysed from across the public sector) as ranging from 10 to 25 basis points (i.e. 0.1% to 0.25%). The Department of Health (2008), in guidance governing the procurement route comparison, suggests the appropriate premium is 12 basis points (i.e. 0.12%). Reflecting these estimates, in the analysis of *bank* financed projects below, a swap credit premium of 15 basis points (0.15%) has been assumed. As the impact of the swap credit premium on the cost of capital benchmarks is very small, no adjustment or sensitivity on this figure has been undertaken.

The *ThomsonOneBanker* database of global project finance loans shows that UK PFI projects that reached financial close between September 1996 and September 2008[81] have been priced on the basis of credit premiums ranging between 0.6% and 1.5%. The upper part of this range appears high when set against the low rate of default historically (1/123), low variability of loan performance, and high recovery rates observed in operational health sector PFI contracts (see Chapter 3). These indicators of high credit quality suggest that a credit margin in the lower part of the identified range is likely to be appropriate. Therefore, in the analysis that follows, a *base case* margin of 75 basis points (0.75%) has been assumed.

[80] While the degree of competition among senior debt providers has a direct influence on the interest rate on *bank loans*, it is likely to influence the interest rate on bonds less directly (and possibly to a lesser extent). The margin on a bond is set by the wider debt capital markets (along with the judgement of a credit rating agency) and will be influenced by the structure and competitiveness of these large markets. However, the bond margin will vary according to how effectively the bond arranger has marketed the bond to investors, and this will be affected by the competitive context in which the bond arranger operates (National Audit Office 2001). If the market for PFI debt is oligopolistic, the arranger is under less pressure to market the bond effectively (and thereby secure a lower margin) than an arranger in a competitive debt market. In addition, the PFI debt market specifically will impact on the overall cost of senior debt, as it will affect both the size of the '*arrangement fee'* (i.e. the fee paid to the arranger) and the *'wrapping fee'* (i.e. the fee paid to the monoline).
[81] In September 2008, the US investment bank Lehman Brothers went into liquidation and, along with related developments, this led to the global financial crisis. The consequences of this for the PFI senior debt market are discussed in Chapter 9. For current purposes, it is sufficient to say that credit margins recorded after this date are likely to be inappropriate benchmarks for the debt costs on the 11 projects evaluated in this chapter.

The chosen benchmark is very close to the figure of 76 basis points (0.76%) recommended in Department of Health (2008) guidance for undertaking procurement route comparisons. However, due to the uncertainty involved in selecting any one figure, the effect of adjusting this base case margin by +/- 0.5 percentage points has also been modelled, as shown below.

Table 7.3 The cost of senior debt for 11 projects, and sensitivity adjustments on the credit margin

Project	Swap rate/gilt rate (%)[i]	Type of finance	*Base case* cost of senior debt (%)	Cost of senior debt (+/-0.5) (%)	
North Cumbria Cumberland Infirmary	6.53	Bond	7.28	7.78	6.78
Norfolk/Norwich[82] Acute hospital rebuild	6.31	Bank	7.21	7.71	6.71
Durham and Darlington General Hospital rebuild	6.31	Bank	7.21	7.71	6.71
NHS Lanarkshire Hairmyres Hospital rebuild	6.13	Bank	7.03	7.53	6.53
NHS Lanarkshire Law hospital (Wishaw)	6.31	Bond	7.06	7.56	6.56
NHS Lothian Royal Infirmary of Edinburgh	6.1	Bank	7.00	7.50	6.50
Nottingham University Queen's Medical Centre	5.72	Bank	6.61	7.11	6.11
East/North Hertfordshire Herts and Essex hospital	5.38	Bank	6.28	6.78	5.78
Hull/ East Yorks Hospitals Castle Hill hospital rebuild	6.15	Bank	7.05	7.55	6.55
Sandwell/West Birm'm Ambulatory care centre	4.97	Bank	5.87	6.37	5.37
Hull/ East Yorks Hospitals Oncology wing development	4.57	Bank	5.42	5.92	4.97

[i] As noted above, base rates are taken directly from the base case financial models relating to these projects, and respectively: Carlisle Hospitals NHS Trust (1998); Norfolk & Norwich University Hospitals NHS Trust (2001); University Hospital of North Durham NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Royal Infirmary of Edinburgh NHS Trust (1998); Nottingham University NHS Trust (1999a); Royston, Buntingford and Bishop's Stortford PCT (2001); Hull & East Yorkshire NHS Trust (2001a); Sandwell & West Birmingham Hospitals NHS Trust (2002); Hull & East Yorkshire NHS Trust (2006).

7.23 The Weighted Average Cost of Capital

As noted above, the financing on a PFI project includes both equity and debt. Therefore, measuring the cost of capital for the overall investment committed by the private sector

[82] Data refers to the actual and projected costs and revenues in the pre-refinancing base case financial model.

counterparty requires the calculation of the *Weighted Average Cost of Capital* (WACC). The WACC is a function of the cost of blended equity for the SPV and the cost of senior debt, in addition to the ratio (or *gearing)* between the two sources of finance and the effective tax rate. The WACC is the appropriate benchmark against which to compare the Project IRR, and the appropriate discount rate for deriving the BCR figures on overall project cash- flow – i.e. Free Cash Flow to the Project. The 'textbook' formula for the WACC is (Hillier *et al* 2010):

$$WACC = \left[\frac{E}{E+D} \times Re\right] + \left[\frac{D}{E+D} \times Rd \times (1 - T\%)\right]$$

where E is the amount of Blended Equity in the financing structure; D is the amount of Senior Debt in the financing structure; Re is the cost of capital for Blended Equity (derived as above); Rd is the benchmark cost of senior debt and $T\%$ is the effective corporation tax rate. The $(1 - T\%)$ function on the right-hand side of the formula reflects the fact that debt interest is tax-deductible in the UK. To illustrate, for a project which has a consistent ratio of debt to equity of 90/10; a benchmark cost of blended equity of 10%; a benchmark cost of debt of 5% and an effective corporation tax rate of 30%, the calculation is as follows:

12% × 10% + 5% × 90% × (1-30%) = 4.35%

However, for a PFI project, the calculation is more complex as there are substantial changes to financial gearing over a project's life - with a high ratio in the early years, reducing over time as debt is paid off and the value of equity increases. On the Sandwell and West Birmingham scheme, for example, financial gearing is 91.7% in 2005, the first year of operation, but declines over time to reach a low point of 39.5%, in 2033. To provide the appropriate discount rate for the calculation of BCRs, a specific WACC has to be calculated for *each period* within the stream of cash-flows. However, it is clear that a single benchmark figure is required in order to evaluate the Project IRR. Therefore, the WACCs listed in Table 7.4 (below) – which are used to benchmark the Project IRRs of the schemes in the set of projects for which the required data are available - are *average*s of the periodic WACCs. In the table, six average WACCs are recorded. Each project has two *base case* WACCs, according to whether the higher or lower equity risk premium has been applied to the gilt rate. The table also shows the impact of adjusting each base case WACC by +/- 0.5%, reflecting a degree of uncertainty about the judiciousness of the credit margin estimate.

Table 7.4 Average period-specific Weighted Average Costs of Capital – base case and adjustments

	Base case		Adjustments			
Project	**WACC (higher) (%)**	**WACC (lower) (%)**	**WACC (higher) +0.5% *Rd***	**WACC (higher) - 0.5% *Rd***	**WACC (lower) +0.5% *Rd***	**WACC (lower) - 0.5% *Rd***
North Cumbria Cumberland Infirmary rebuild	6.98	5.99	7.15	6.75	6.32	5.76
Norfolk/Norwich Acute hospital rebuild	6.08	5.52	6.36	5.79	5.81	5.23
Durham and Darlington[83] General Hospital rebuild	5.93	5.42	6.22	5.65	5.71	5.14
NHS Lanarkshire Hairmyres Hospital rebuild	7.23	6.06	7.45	7.00	6.29	5.84
NHS Lanarkshire Law hospital rebuild (Wishaw)	5.77	6.71	6.95	6.47	6.01	5.53
NHS Lothian Royal Infirmary of Edinburgh	6.77	5.82	7.02	6.53	6.07	5.57
Nottingham University Queen's Medical Centre	7.12	5.77	7.32	6.91	5.98	5.57
East/North Hertfordshire Herts and Essex hospital	6.00	5.22	6.26	5.83	5.48	5.05
Hull/ East Yorks Hospitals Castle Hill hospital rebuild	7.12	5.90	7.32	6.92	6.10	5.70
Sandwell/West Birm'm Ambulatory care centre	5.23	4.72	5.51	4.94	5.00	4.43
Hull/ East Yorks Hospitals Oncology wing development	4.88	4.34	5.17	4.62	4.63	4.08

[83] Gearing data is only available in respect of the first 10 years of the contract period. Thus, it is not possible construct an average WACC from period-specific WACCs over the full term of the contract for this project.

7.3 Results

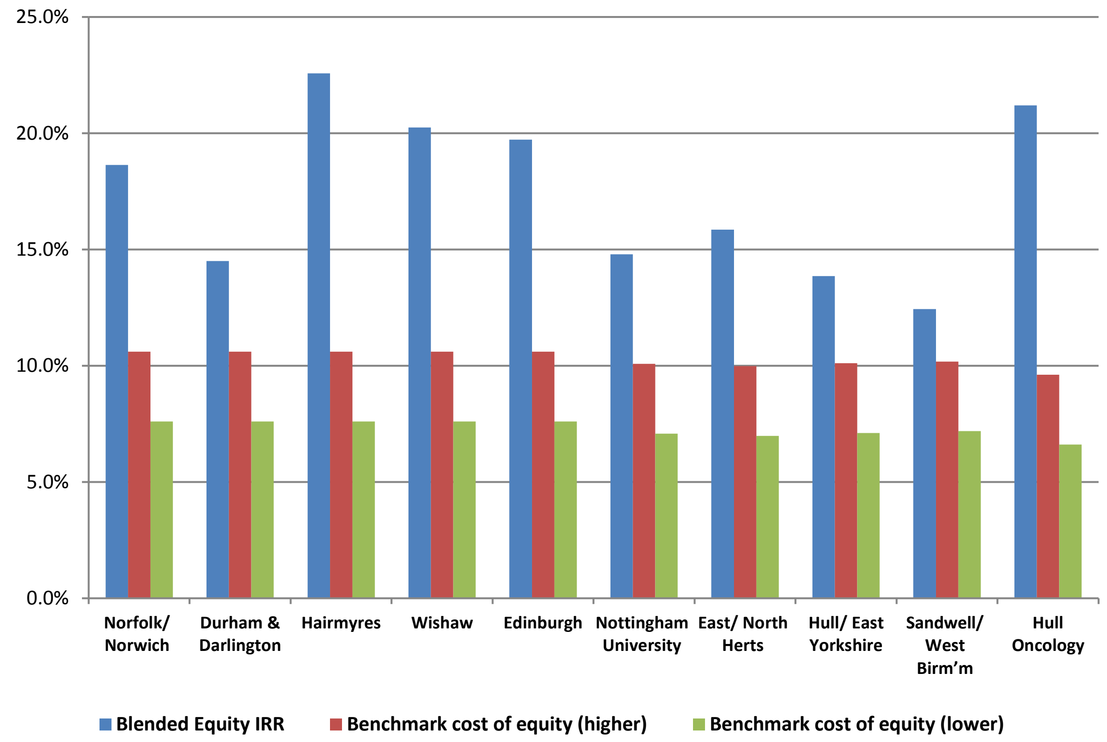
In this section, the cost of capital benchmarks are used to examine the incidence and the extent of excess returns to equity and debt investors on each of the 11 projects in the data set. The analysis for each project (where the data in the financial model allows) involves:

- a comparison of the pre-tax nominal Blended Equity IRR and the benchmark cost of blended equity (with both higher and lower equity risk premium assumptions);
- a comparison of the post-tax nominal Project IRR with the Weighted Average Cost of Capital (WACC) (with higher and lower equity risk premium assumptions, and adjusted assumptions on the cost of debt); and
- calculation of the Benefit Cost Ratios on blended equity and project cash-flows (with adjusted assumptions on risk premiums and the cost of debt,) using the cost of blended equity and WACC benchmarks as discount rates.

7.31 Comparing Blended Equity IRRs and cost of blended equity benchmarks

As Figure 7.1 shows (overleaf), the pre-tax Blended Equity IRR is for each of the schemes significantly higher than the corresponding benchmark cost of blended equity, irrespective of whether the *higher* or *lower* equity risk premium parameter is used in the comparison. The mean average pre-tax Blended Equity IRR is 17.4% (range 12.43% to 22.58%). On the basis of the higher risk premium assumption, the mean average benchmark cost of blended equity is 10.3% (range 9.98% to 10.79%). On the basis of the lower risk premium assumption, the mean average benchmark cost of blended equity is 7.3% (range 7.07% to 7.79%). Thus, on the basis of the higher risk premium assumption, the mean average "spread" between each Blended Equity IRR and the corresponding benchmark cost of blended equity (indicating the excess return) is 7.1% (range 2.25% to 11.98%). On the basis of the lower risk premium, the mean average spread is 9.63% (range of 5.25% to 14.98%).

Figure 7.1 Pre-tax Blended Equity IRR versus the benchmark cost of blended equity benchmarks (higher/lower equity risk premium)

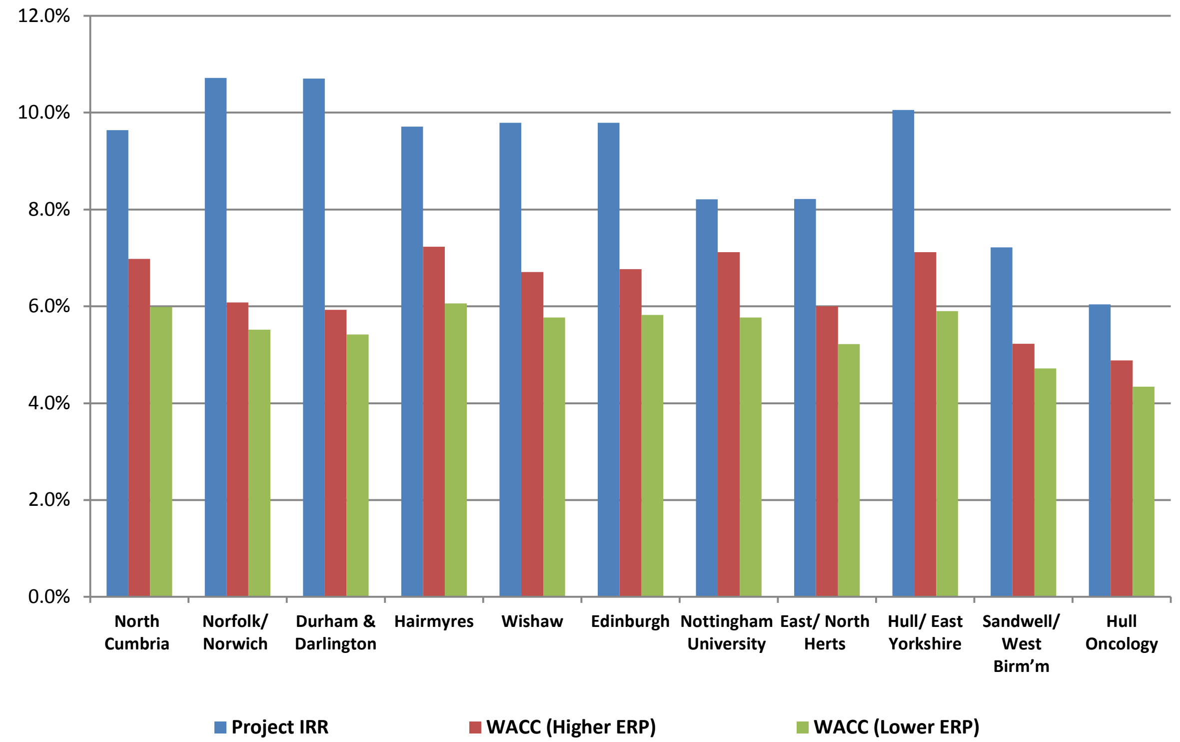


7.32 Comparing Project IRRs and Weighted Average Cost of Capital benchmarks

As Figure 7.2 shows (overleaf), the post-tax Project IRR is for each of the 11 projects higher than the corresponding *base case* benchmark WACC, irrespective of whether the *higher* or *lower* equity risk premium parameter values is used in the comparison. The mean average post-tax Project IRR is 9.1% (range 6.04% to 10.72%). On the basis of the higher risk premium assumption, the mean average base case WACC is 6.4% (range 4.9% to 7.2%). On the basis of the lower risk premium assumption, the mean base case WACC is 5.5% (range

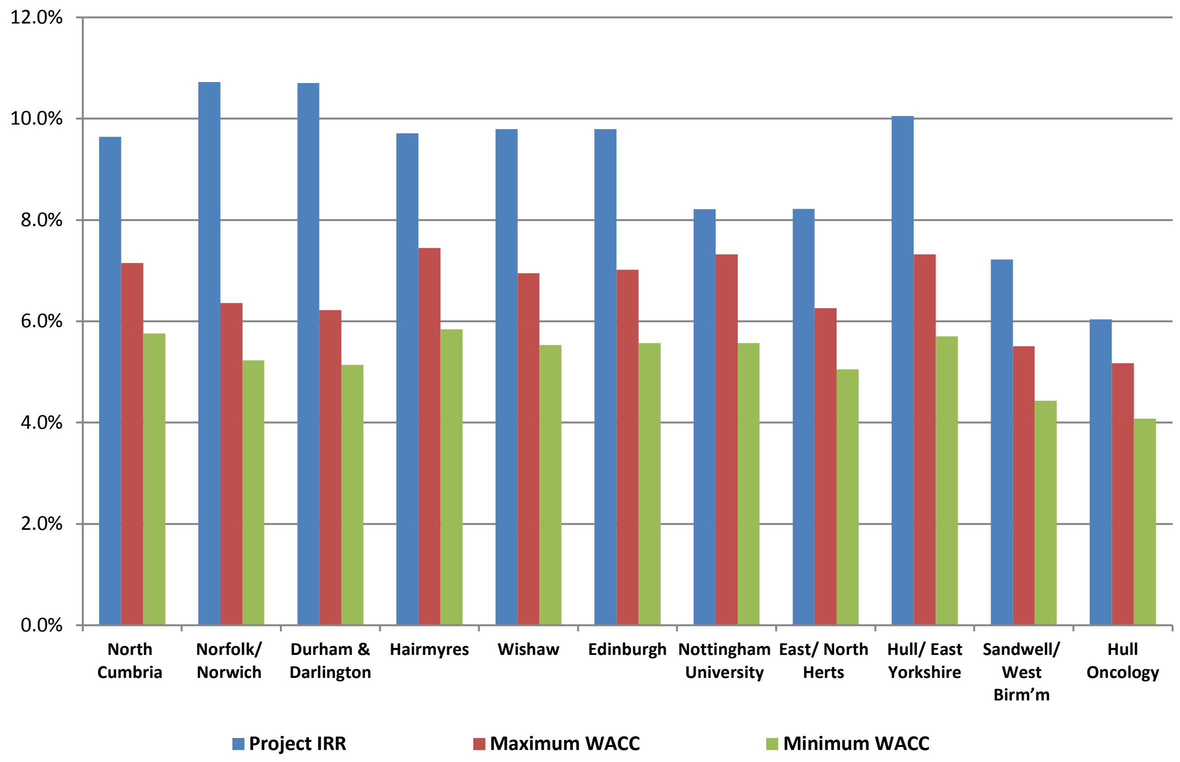
4.3% to 6.1%). Therefore, on the basis of the higher risk premium assumption, the mean average spread (indicating the excess return) between each Project IRR and the corresponding WACC is 2.7% (range 1.1% to 4.8%). On the basis of the lower risk premium assumption, the average spread is somewhat higher, at 3.6% (range 1.7% to 5.8%).

Figure 7.2 Post-tax Project IRR versus the benchmark base case Weighted Average Cost of Capital (higher/lower equity risk premium)



The impact of adjusting the credit margin assumption on the reference cost of debt, and thereby adjusting the WACC, is shown in Figure 7.3 (overleaf). The maximum WACC shown in the figure incorporates the higher equity risk premium and a + 0.5% adjustment to the base case cost of debt. The mean spread between the Project IRR and the WACC calculated on this basis is 2.5% (range 0.87% to 4.5%). The minimum WACC shown in the figure incorporates the lower equity risk premium and a - 0.5% adjustment to the base case cost of debt. The mean spread between the Project IRR and the WACC on this basis is 3.8% (range 2% to 4.8%). Thus, even on the basis of the most conservative WACC (incorporating the highest equity and debt risk premiums), the Project IRR is for all projects higher than the benchmark WACC (although it is notable that for two projects the spread is less than 1%).

Figure 7.3 Post-tax Project IRR versus the maximum and minimum Weighted Average Cost of Capital benchmarks



7.33 Benefit-Cost Ratios on Free Cash Flow to Blended Equity

Table 7.5 (overleaf) shows for each project: (1) the present value of the capital projected to be invested in the form of blended equity; (2) the present value of the revenue projected to be earned on blended equity; and (3) the Benefit-Cost Ratio generated by these expenditure and revenue cash-flow streams, which are calculated by dividing the latter by the former.

As the Table shows, Benefit Cost Ratios are significantly higher than 1 for all projects, irrespective of whether the *higher* or *lower* cost of blended equity is used in setting the discount rate. Applying the discount rates incorporating the higher cost of blended equity results in a mean Benefit Cost Ratio of 3.62 (range 1.3 to 6.23), while applying discount rates based on the lower cost of blended equity results in a mean of 4.86 (range 1.96 to 8.13).

Table 7.5 Present values of blended equity expenditure and revenue, and Benefit-Cost Ratios of Free Cash-flow to Blended Equity

	(1)		(2)		(3)	
Project	**PV of capex (£m)**		**PV of revenue (£m)**		**Benefit Cost Ratio**[84]	
	Higher	**Lower**	**Higher**	**Lower**	**Higher**	**Lower**
North Cumbria Cumberland Infirmary rebuild[i]	3.86	4.34	7.51	12.66	1.94	2.92
Norfolk/Norwich Acute hospital rebuild[ii]	26.71	28.14	127.7	173.63	4.78	6.17
Durham & Darlington[85] Acute Hospital rebuild	-	-	-	-	-	-
NHS Lanarkshire Hairmyres Hospital rebuild[iii]	7.05	7.40	36.27	51.80	5.14	7.0
NHS Lanarkshire Law hospital rebuild (Wishaw)[iv]	7.95	8.87	16.03	24.40	2.02	2.75
NHS Lothian Royal Infirmary of Edinburgh[v]	11.3	11.9	70.36	95.72	6.23	8.04
Nottingham University Queen's Medical Centre rebuild[vi]	1.72	1.74	9.66	14.13	5.60	8.13
East/North Hertfordshire Herts and Essex hospital[vii]	1.38	1.39	4.67	6.1	3.40	4.38
Hull/ East Yorks Hospitals Castle Hill hospital rebuild[viii]	1.20	1.14	3.26	4.36	2.94	3.81
Sandwell/West Birm'm Ambulatory care centre[ix]	2.42	2.49	3.14	4.89	1.30	1.96
Hull/ East Yorks Hospitals Oncology wing development[x]	4.13	4.31	11.89	14.78	2.88	3.43
TOTAL/ AVERAGE	**67.72**	**71.72**	**290.49**	**402.47**	**3.62**	**4.86**

[i] Carlisle Hospitals NHS Trust (1998); [ii] Norfolk & Norwich University Hospitals NHS Trust (2001); [iii] Lanarkshire Acute Hospitals NHS Trust (1998a); [iv] Lanarkshire Acute Hospitals NHS Trust (1998b); [v] Royal Infirmary of Edinburgh NHS Trust (1998); [vi] Nottingham University NHS Trust (1999); [vii] Royston, Buntingford and Bishop's Stortford PCT (2001); [viii] Hull & East Yorkshire NHS Trust (2001); [ix] Sandwell and West Birmingham Hospitals NHS Trust (2002); [x] Hull & East Yorkshire NHS Trust (2006).

[84] Some errors due to rounding.
[85] No BCR figures can be derived for this scheme. The BCR on FCFBE cannot be calculated due to the absence of reliable cash-flow data. The BCR on FCFP cannot be calculated due to the absence of gearing data for the full contract period. These data are restricted to the first 10 years of the project.

7.34 Benefit Cost Ratios on Free Cash Flow to the Project

Table 7.6 (overleaf) shows for each project where required data is available: (1) the present value of the amount of capital projected to be invested (equity plus debt); (2) the present value of the free cash projected to flow to project investors of all types; and (3) the Benefit-Cost Ratios generated by expenditure and revenue cash-flows, derived by dividing the latter by the former. For each project, present values are derived using WACC benchmarks on *higher* and *lower* equity risk premium assumptions, along with the *base case* cost of debt.

As the table shows, Benefit Cost Ratios are higher than 1 for all projects, irrespective of which equity risk premium assumption is applied. On the basis of the higher equity risk premium, the mean Benefit Cost Ratio is 1.68, (range 1.3 to 2.01), while on the basis of the lower equity risk premium, the mean Benefit Cost Ratio is 1.79 (range 1.38 to 2.18).

Table 7.6 Present values of capital expenditure and revenue, and Benefit-Cost Ratios of Free Cash-Flow to the Project						
	(1)		(2)		(3)	
Project	**PV of capex (£m)**		**PV of revenue (£m)**		**Benefit Cost Ratio**[86]	
	Higher	**Lower**	**Higher**	**Lower**	**Higher**	**Lower**
North Cumbria Cumberland Infirmary rebuild[i]	54.26	54.39	85.89	88.48	1.58	1.63
Norfolk/Norwich Acute hospital rebuild[ii]	158.67	159.1	285.93	310.93	1.8	1.95
Durham & Darlington[87] Acute Hospital rebuild	-	-	-	-	-	-
NHS Lanarkshire Hairmyres Hospital rebuild[iii]	65.59	65.59[88]	91.5	105.65	1.39	1.61
NHS Lanarkshire Law hospital rebuild (Wishaw)[iv]	125.9	126.0	186.15	199.2	1.48	1.59
NHS Lothian Royal Infirmary of Edinburgh[v]	168.12	169.28	328.01	350.8	1.95	2.07
Nottingham University Queen's Medical Centre rebuild[vi]	15.3	15.33	29.6	33.45	1.98	2.18
East/North Hertfordshire Herts and Essex hospital[vii]	13.95	13.96	24.09	25.39	1.73	1.82
Hull/ East Yorks Hospitals Castle Hill hospital rebuild[viii]	8.03	8.03	16.13	17.31	2.01	2.16
Sandwell/West Birm'm Ambulatory care centre[ix]	30.0	30.09	39.09	41.46	1.3	1.38
Hull/ East Yorks Hospitals Oncology wing development[x]	49.42	49.56	75.79	78.99	1.53	1.59
TOTAL/AVERAGE	**689.24**	**691.33**	**1162.18**	**1251.66**	**1.68**	**1.79**

[i] Carlisle Hospitals NHS Trust (1998); [ii] Norfolk & Norwich University Hospitals NHS Trust (2001); [iii] Lanarkshire Acute Hospitals NHS Trust (1998a); [iv] Lanarkshire Acute Hospitals NHS Trust (1998b); [v] Royal Infirmary of Edinburgh NHS Trust (1998); [vi] Nottingham University NHS Trust (1999); [vii] Royston, Buntingford and Bishop's Stortford PCT (2001); [viii] Hull & East Yorkshire NHS Trust (2001); [ix] Sandwell and West Birmingham Hospitals NHS Trust (2002); [x] Hull & East Yorkshire NHS Trust (2006).

Table 7.7 (overleaf) shows the impact on the Benefit Cost Ratios of adjusting the credit margin assumption by +/- 0.5%. Column (d) records for each project the Benefit Cost Ratio derived by the maximum Weighted Average Cost of Capital benchmark – i.e. that derived through applying the *higher* equity risk premium parameter and the +0.5% adjustment to the *base case* cost of senior debt. On this basis, the mean Benefit Cost Ratios is 1.63 (range

[86] There are some errors due to rounding.
[87] No BCR figures can be derived for this scheme. The BCR on FCFBE cannot be calculated due to the absence of cash-flow data. The BCR on FCFP cannot be calculated due to the absence of gearing data for the full contract period. As noted in footnotes above, these data are restricted to the first 10 years of the project.
[88] The present values are the same for both higher and lower equity risk premium as the SPV has gearing of 100% during the main capital expenditure period – i.e. blended equity is projected to be drawn down after the building is completed. The risk premium therefore has no impact on the calculation of these present values.

1.26 to 1.99). Column (g) in the table records for each project the Benefit Cost Ratio derived by the minimum Weighted Average Cost of Capital – i.e. that derived through applying the *lower* equity risk premium parameter and the -0.5% adjustment to the *base case* cost of senior debt. On this basis, the mean Benefit Cost Ratio is 1.85 (range 1.43 and 2.22). Therefore, even on the basis of the most conservative Weighted Average Cost of Capital assumption (i.e. using discount rates incorporating the higher equity risk premium and +0.5% cost of debt adjustment), the Benefit Cost Ratio is for all projects higher than 1.

Table 7.7 Benefit Cost Ratios on Free Cash Flow to the Project – base case vs. adjusted analyses

	Base case		Adjustments			
(a)	(b)	(c)	(d)	(e)	(f)	(g)
Project	**BCR (higher) (%)**	**BCR (lower) (%)**	**BCR (higher) +0.5% *Rd***	**BCR (higher) - 0.5% *Rd***	**BCR (lower) +0.5% *Rd***	**BCR (lower) - 0.5% *Rd***
North Cumbria Cumberland Infirmary rebuild[i]	1.58	1.63	1.52	1.65	1.56	1.69
Norfolk/Norwich Acute hospital rebuild[ii]	1.8	1.95	1.73	1.88	1.88	2.04
Durham and Darlington General Hospital rebuild	-	-	-	-	-	-
NHS Lanarkshire Hairmyres Hospital rebuild[iii]	1.39	1.61	1.35	1.43	1.56	1.66
NHS Lanarkshire Law hospital rebuild (Wishaw)[iv]	1.48	1.59	1.43	1.53	1.54	1.64
NHS Lothian Royal Infirmary of Edinburgh[v]	1.95	2.07	1.92	1.98	2.04	2.1
Nottingham University Queen's Medical Centre rebuild[vi]	1.98	2.18	1.9	1.96	2.15	2.21
East/North Hertfordshire Herts and Essex hospital[vii]	1.73	1.82	1.7	1.74	1.79	1.84
Hull/ East Yorks Hospitals Castle Hill hospital rebuild[viii]	2.01	2.16	1.99	2.04	2.16	2.22
Sandwell/West Birm'm Ambulatory care centre[ix]	1.3	1.38	1.26	1.36	1.33	1.43
Hull/East Yorks Hospitals New oncology development[x]	1.53	1.59	1.5	1.56	1.56	1.62
AVERAGE	**1.65**	**1.8**	**1.63**	**1.71**	**1.76**	**1.85**

[i] Carlisle Hospitals NHS Trust (1998); [ii] Norfolk & Norwich University Hospitals NHS Trust (2001); [iii] Lanarkshire Acute Hospitals NHS Trust (1998a); [iv] Lanarkshire Acute Hospitals NHS Trust (1998b); [v] Royal Infirmary of Edinburgh NHS Trust (1998); [vi] Nottingham University NHS Trust (1999); [vii] Royston, Buntingford and Bishop's Stortford PCT (2001); [viii] Hull & East Yorkshire NHS Trust (2001); [ix] Sandwell and West Birmingham Hospitals NHS Trust (2002); [x] Hull & East Yorkshire NHS Trust (2006).

7.35 Interpretation of results

These results show that projected returns to investors on this group of 11 NHS PFI schemes are higher than can be rationalised by the level of risks being borne – as reflected in:

• the benchmark costs of capital for blended equity (constructed according to the discount rates used by market participants in valuing their PFI portfolios);

• the benchmark costs of debt (constructed according to the degree of credit default risk involved in lending to these projects, along with a consideration of market norms); and

• the Weighted Average Cost of Capital estimates (which are a product of the two).

Therefore, returns on both equity and the project overall incorporate an excess premium.

Excess returns have been measured in two ways:

(i) through identifying the *spread* between the IRR values and the relevant cost of capital benchmarks; and

(ii) through calculating Benefit Cost Ratios, derived by discounting cash flows at the relevant cost of capital (with any result higher than 1 indicating an excess return).

Both measures agree on the presence of excess returns on both forms of cash flow and for all of the data set projects, even where the most conservative cost of capital benchmarks (i.e. those incorporating *higher* equity risk premium and the + 0.5% adjustment to the base case cost of debt) are used. On average, the spread between Blended Equity IRR and the benchmark cost of blended equity is 7.1% on the basis of the higher equity risk premium parameter, and 10.1% on the lower. The equivalent Benefit Cost Ratios are 3.62 and 4.86.

On average, the spread between Project IRR and the *base case* Weighted Average Cost of Capital is 2.7% on the basis of the higher equity risk premium parameter, and 3.6% on the lower. The equivalent Benefit Cost Ratio measures are 1.68 and 1.79, respectively. Applying the maximum Weighted Average Cost of Capital (i.e. that which incorporates the higher equity risk premium and the + 0.5% adjustment to the base case cost of senior debt) generates a spread of 2.5%; while applying the minimum Weighted Average Cost of Capital (i.e. the lower equity risk premium and the - 0.5% adjustment to the base case cost of senior debt) generates a spread of 3.8%. The equivalent Benefit Cost Ratios are 1.63 and 1.85. Interestingly, when the projects are ranked on the magnitude of the excess return (based on the higher equity risk assumption in each case), the two methods return different results (see Table 7.8 overleaf). For example, blended equity return on the NHS Lothian - Edinburgh scheme is the highest on the BCR method, but only the fourth highest using the IRR versus cost of blended equity comparison. Similarly, the project return on the Nottingham University scheme has the tenth highest spread between the IRR and the WACC, but the scheme has the second highest Benefit Cost Ratio on project cash flow. This discrepancy underlines the limitations of using the IRR method in isolation when considering the returns to investors, as is standard practice in government (HM Treasury 2007a). As noted at the start of this chapter, the opportunity cost assumption in the IRR makes it a problematic tool when income is concentrated towards the end of the contractual period, as is typically the case for FCFBE. Benefit Cost Ratios involve a simple discounted cash-flow method, which is well-correlated with NPV, and does not contain the opportunity cost assumption of the IRR. The BCR method therefore provides a more reliable indicator of the degree of excess return.

As the BCR provides the most accurate measure of return, the key findings are revealed as:

(1) in respect of Free Cash Flow to Blended Equity, the mean present value of the revenue component of cash flow is roughly four-to-five times higher than the present value of the expenditure component; and

(2) in respect of Free Cash Flow to the Project, the mean is one-and-a-half to two times higher. This provides robust evidence of significant excess returns to PFI investors.

It is also evident that, when ranking schemes on the size of the spread, the position of projects varies considerably depending on which form of cash flow is being examined. For example, the Hairmyres scheme has the highest spread on blended equity cash flow but only the seventh highest on project cash flow. Conversely, Durham and Darlington has the top-ranking spread on project cash-flow, but the third lowest on blended equity. This seems anomalous, as it may be expected that a high Blended Equity IRR would be correlated with a high Project IRR. However, the link between the returns on different sources of finance is a complex one. A high return on the former may de-risk the project from the perspective of a senior lender, which may feel able to provide a relatively low interest rate in the knowledge that the value of equity in the project (and therefore the size of the risk "buffer") is relatively high. In some cases, this may lower the return on the project (Yescombe 2008). Conversely, a low interest rate on senior debt may reduce the project return while enabling SPV investors to increase their return - especially where capital markets are uncompetitive.

Table 7.8 Ranking projects by excess return: Benefit Cost Ratios vs the IRR-cost of capital spread				
	Blended Equity		**Project**	
Project	**Benefit-Cost Ratio (rank)**	**IRR-cost of capital spread (rank)**	**Benefit-Cost Ratio (rank)**	**IRR-cost of capital spread (rank)**
North Cumbria Cumberland Infirmary	9	6	6	6
Norfolk/Norwich Acute hospital rebuild	4	5	4	2
Durham and Darlington General Hospital rebuild	-	9	-	1
NHS Lanarkshire Hairmyres Hospital rebuild	3	1	9	7
NHS Lanarkshire Law hospital (Wishaw)	8	3	8	3
NHS Lothian Royal Infirmary of Edinburgh	1	4	3	4
Nottingham University Queen's Medical Centre	2	8	2	11
East/North Hertfordshire Herts and Essex hospital	6	7	5	8
Hull/ East Yorks Hospitals Castle Hill hospital rebuild	7	10	1	5
Sandwell/West Birm'm Ambulatory care centre	10	11	10	9
Hull/East Yorks Hospitals New oncology development	5	2	7	10

7.4 Considering the representativeness of these findings

The refusal of many NHS Trusts to disclose financial models, particularly for more recent projects, has resulted in:

(1) a limited number of financial models available for analysis; and

(2) a weighting in the data set towards contracts that reached financial close at a relatively early phase of the PFI programme's development.

As the Tables above illustrate, 10 of the 11 financial models in the data set relate to contracts that reached financial close within the period November 1997 to December 2002 (the remaining scheme was signed in February 2006). Out of the population of 123 PFI contracts signed by April 2010,[89] more than half (64) reached financial close after December 2002. It is possible, therefore, that the magnitude of the excess investor returns identified in the result section above will fail to reflect that on the market as a whole, and for more recent projects in particular. It may be, for instance, that the level of excess returns on contracts would reduce over time as the market matured and investors gained experience.

As a result, it is necessary to examine whether the scale of excess returns on the data set projects is representative in terms of:
(a) other schemes that reached financial close in the same period as the schemes; and
(b) the full period of the programme, from its inception to the end of 2010.

To undertake this representativeness analysis, data on investor returns for a larger number of projects has been accessed. Pre-tax nominal Blended Equity IRRs for 48 signed NHS PFI projects, and post-tax nominal Project IRRs for 29 signed NHS PFI projects were provided by the Department of Health (2009) in response to a request made under the Freedom of Information Act. The department did not provide IRR data relating to a number of schemes, and justified these non-disclosure decisions for various reasons, including: (a) the contracting authority had not collected or not retained the data; (b) the contracting authority had collected and retained the data but regarded these data as commercially confidential; or (c) the contracting authority was a quasi-independent "Foundation Trust", and was thereby not required to provide such data to central government. In addition, the Department does not hold data on PFI programmes managed by the devolved authorities.

[89] This relates only to projects with a capital value of more than £10 million, and excludes ICT-related schemes.

Therefore, the data base provided by the Department of Health was supplemented by an examination of the 98 Full Business Cases (FBCs), secured through requests under the Freedom of Information Act, as described in Chapter 6 of this thesis.[90] In many cases, FBCs include a *Financing the Scheme* chapter in which the SPV's funding structure (sources and uses) is described and certain outputs from the financial models are summarised.

As part of this, Blended Equity and Project IRRs are sometimes recorded (though it is common for these numbers to be redacted before the documents are placed in the public domain). Examination of these documents supplied pre-tax nominal Blended Equity IRRs for an additional 18 projects, and post-tax nominal Project IRRs for 12 projects. Thus, the Department of Health response, combined with the review of FBCs, provided a comparator group of Blended Equity IRRs relating to 66 hospital PFI projects (more than half of the total population of PFI projects signed by the NHS); and a comparator group of Project IRRs relating to 43 projects (approximately one third of the total population of PFI projects).

It is important to note, however, that in the absence of financial models for these projects, the returns data cannot be independently assessed and validated. The IRRs cannot be assessed with the same degree of rigour as for the 11 data set projects because cash flow data are not available, and the exact method of IRR calculation is not disclosed. In addition, as BCR values cannot be calculated without cash flow data – thus, the most accurate measure of return cannot be established for these schemes. Nonetheless, these data do enable a satisfactory, if incomplete, analysis of representativeness to be undertaken.

---

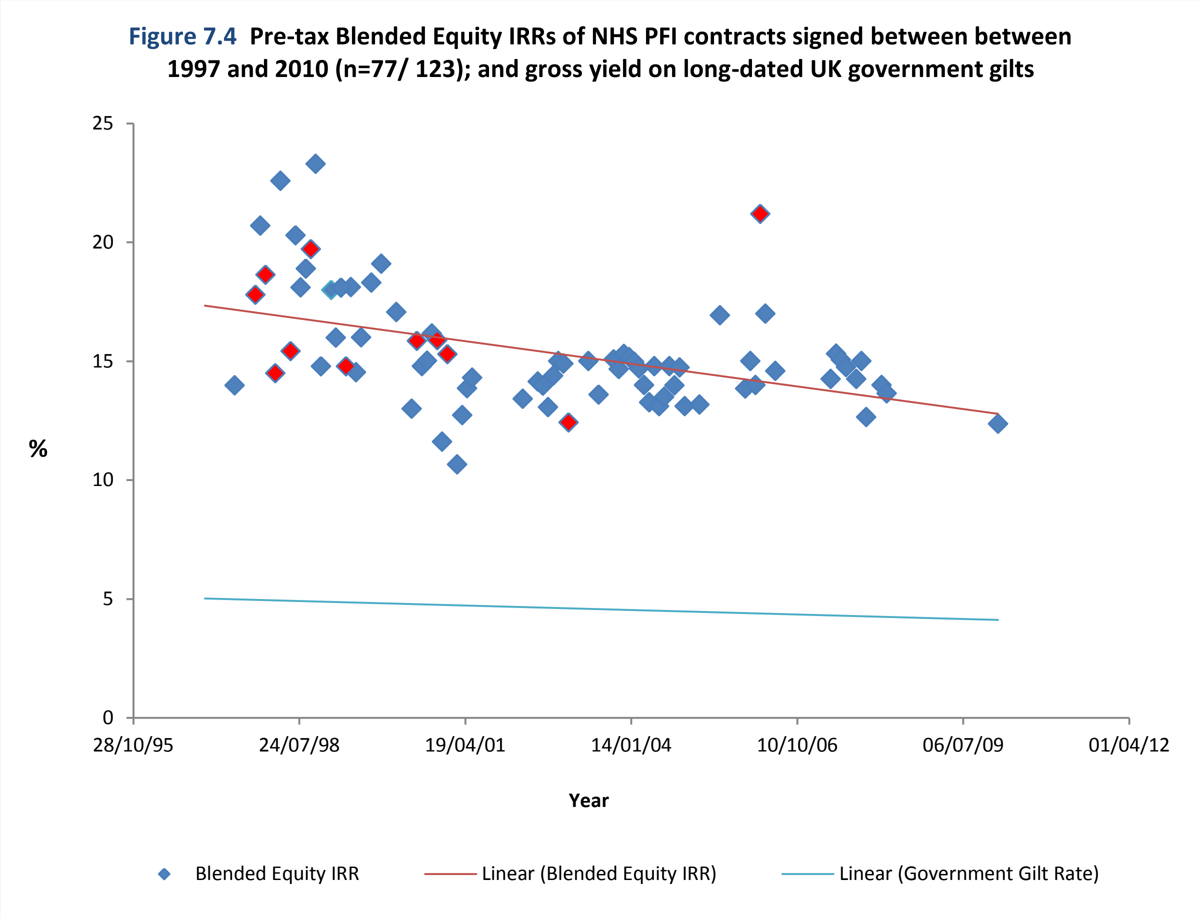
[90] As described in Chapter 3, FBCs are prepared by NHS organisations for the purpose of seeking approval from ministers for projects that have come to the end of procurement and are about to be financially closed.

This analysis proceeds as follows. For each IRR in the comparator group, the relevant base rate (specifically, the *long-dated gilt rate* for FCFBE return and the *swap rate* for FCFP) and the “spread” over this base rate is identified. Equivalent “spreads” can also be identified for the 11 data set projects, and the two can be compared. In this way, the representativeness of the findings recorded above can be examined in terms of (a) and (b) outlined above.[91]

7.41 The representativeness of the return on Blended Equity

Figure 7.4 (overleaf) illustrates the distribution of pre-tax nominal Blended Equity IRRs for the 77 projects that reached financial close between July 1997 and April 2010 (incorporating the 66 Blended Equity IRRs in the comparator group, plus the 11 data set IRRs – which are coloured red). It is evident from the red linear trend-line that the average Blended Equity IRR has declined over the time period. However, the blue linear trendline shows that a large proportion of this reduction is accounted for by a fall in the cost of long-dated UK government gilts (to which cost of capital estimates are referenced, as described above).

[91] It should be noted that these “spreads” are not measures of the excess return, but measures of the return above the base rate. They therefore include an element of ‘legitimate’ risk premium along with any excess return. The purpose here is not to evaluate the returns on this larger comparator group of projects, but to assess the extent to which the representativeness of the data set returns in relation to the relevant base rates.



Sources: ***Blended Equity IRRs for 11 data set projects:*** North Cumbria University Hospitals NHS Trust (1998); Norfolk & Norwich University Hospitals NHS Trust (2001); University Hospitals of North Durham NHS Trust (1998); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Lothian University Hospitals NHS Trust (1998); Nottingham University NHS Trust (1999); Royston, Buntingford and Bishop's Stortford PCT (2001); Hull & East Yorkshire NHS Trust (2001); Sandwell and West Birmingham Hospitals NHS Trust (2002); Hull & East Yorkshire NHS Trust (2006). ***Blended Equity IRRs of projects not in data set:*** Department of Health (2009); Bro Morgannwg NHS Trust (2000); Cardiff and Vale NHS Trust (2000); Kingston Hospital NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Ayrshire & Arran (2004); NHS Ayshire and Arran (2006); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Forth Valley (2007b); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2005b); NHS Greater Glasgow and Clyde (2006); NHS Tayside (2003); Portsmouth Hospitals NHS Trust (2005); University College London Hospitals (2000); University Hospitals Coventry and Warwickshire (2002); University Hospital of North Staffordshire NHS Trust (2007). ***Government Gilt Rate:*** Debt Management Office (2010).

In order to assess the "within-period representativeness" of data set returns, the period over which PFI projects reached financial close has been split into groups of three years (calendar years 1997-1999; 2000-2002; 2003-2005) and one period of two years (calendar years 2009-2010). As Table 7.9 shows (overleaf), in the first period, the average spread in IRR over the UK government gilt rate among the seven data set projects that reached financial close is 12.6% - just 0.26% lower than the average spread among the 14 comparator group contracts that reached financial close in this period. In the second period, the average spread among the two data set projects that reached financial close is 9.51% - just 0.06% lower than that among the 18 comparator group contracts that were signed in this period. As the average above-gilt return on the 10 earlier data set schemes is similar to the average for the comparator schemes that signed in the same periods, these returns can be viewed as representative of the market in the period in which the contracts were signed.

The most recently signed project within the data set has an above-base rate spread of 17.1%. This is an outlier, as the average spread among the 13 comparator projects that signed in the fourth period is 10.2%. In addition, it is clear from Figure 7.4 (above) and Table 7.9 (below) that the extent of the spread between Blended Equity IRR and the long-dated gilt rate declined over time. As a result, there is a 1.6% difference between the average spread among the data set projects versus the average among comparator schemes. This implies that the excess returns recorded in this chapter are, on average, slightly higher than would be representative for the market as a whole, especially in respect of recent schemes.

Table 7.9 Assessing "within-period" representativeness of excess returns to blended equity

Period	Average spread on data set projects[i]	Average spread on comparator projects[ii]	Difference	Representativeness
1997-1999	12.58385	12.85668	0.272835	High
2000-2002	9.490504	9.568875	0.078371	High
2003-2005	n/a	9.790101	n/a	n/a
2006-2008	17.08612	10.21308	-6.87304	Low
2009-2010	n/a	8.27	n/a	n/a
1997-2010	*12.15*	*10.55*	*1.6*	*Medium*

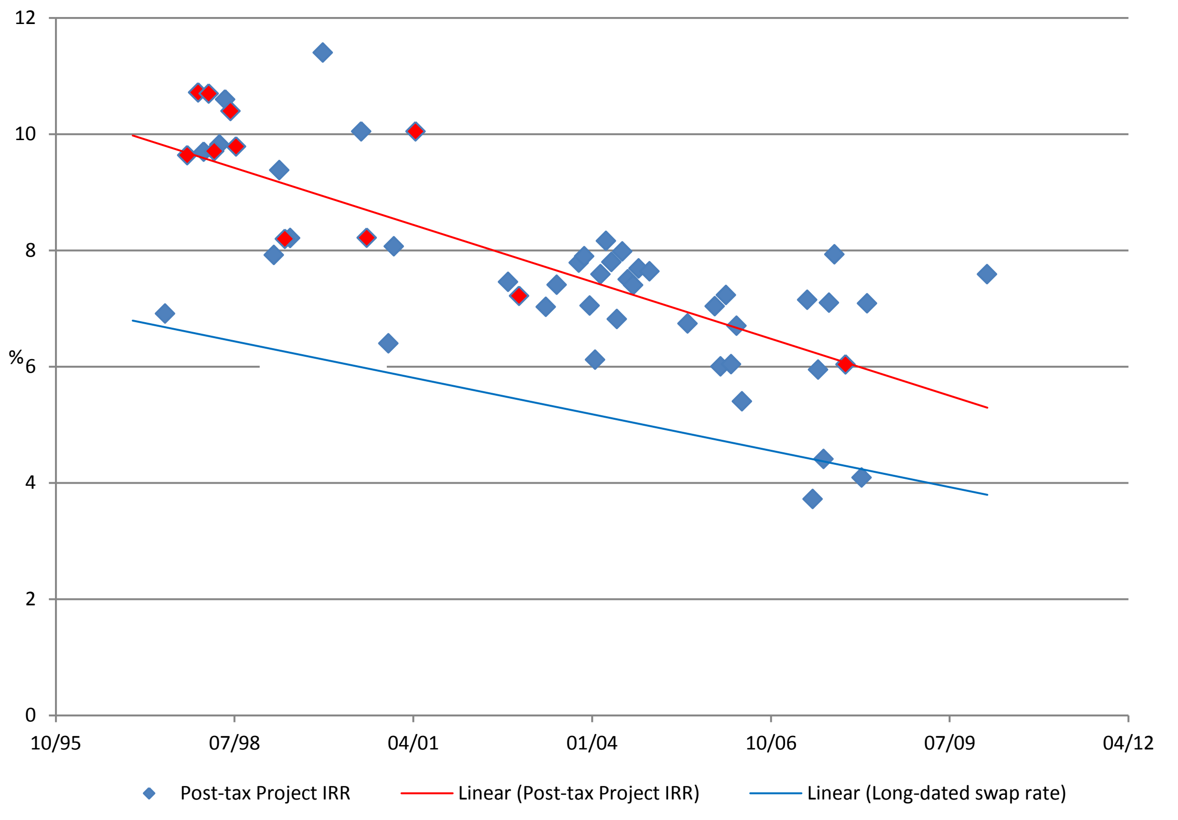
[i] Carlisle Hospitals NHS Trust (1998); Norfolk & Norwich University Hospitals NHS Trust (2001); University Hospital of North Durham NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Royal Infirmary of Edinburgh NHS Trust (1998); Nottingham University NHS Trust (1999a); Royston, Buntingford and Bishop's Stortford PCT (2001); Hull & East Yorkshire NHS Trust (2001a); Sandwell and West Birmingham Hospitals NHS Trust (2002); Hull & East Yorkshire NHS Trust (2006).
[ii] Department of Health (2009); Bro Morgannwg NHS Trust (2000); Cardiff and Vale NHS Trust (2000); Kingston Hospital NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Ayrshire & Arran (2004); NHS Ayshire and Arran (2006); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Forth Valley (2007b); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2005b); NHS Greater Glasgow and Clyde (2006); NHS Tayside (2003); Portsmouth Hospitals NHS Trust (2005); University College London Hospitals (2000); University Hospitals Coventry and Warwickshire (2002); University Hospital of North Staffordshire NHS Trust (2007).

Notwithstanding the above, it should be noted that Blended Equity IRR figures are held for only one project that reached financial close in the period since April 2008. In other words, the impact on blended equity returns of the financial crisis (which is conventionally traced to the collapse of Lehman Brothers in September 2008) is not known. However, it is known that equity risk premiums used by PFI investors have increased since this date when compared to those seen in the years prior to the credit crunch (see Table 7.1 on p. 192). This is likely to have had an impact on the above-gilt rates of return targeted by investors.

7.42 The representativeness of the return on the Project

Figure 7.5 (overleaf) illustrates the distribution of post-tax nominal Project IRRs for the 43 projects that reached financial close between July 1997 and April 2010 (incorporating the 32 Project IRRs in the comparator group plus the 11 data set IRRs – which are coloured red in the figure). It is evident from the red linear trend-line that the average Project IRR has declined over time. However, the blue linear trendline makes clear that a high proportion of this reduction over the period is accounted for by a fall in the return on long-dated swaps, rather than a reduction in the differential between the 43 Project IRRs and these base rates.

Figure 7.5 Post-tax Project IRRs on NHS PFI projects reaching financial close between July 1997 and February 2010, and rate on long-dated interest rate swaps



Sources: ***Project IRRs for the 11 data set projects:*** North Cumbria University Hospitals NHS Trust (1998); Norfolk & Norwich University Hospitals NHS Trust (2001); University Hospitals of North Durham NHS Trust (1998); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Lothian University Hospitals NHS Trust (1998); Nottingham University NHS Trust (1999); Royston, Buntingford and Bishop's Stortford PCT (2001); Hull & East Yorkshire NHS Trust (2001); Sandwell and West Birmingham Hospitals NHS Trust (2002); Hull & East Yorkshire NHS Trust (2006). ***Project IRRs of projects not in the data set:*** Department of Health (2009); Kingston Hospital NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2006); NHS Tayside (2003); Portsmouth Hospitals NHS Trust (2005); University College London Hospitals (2000); University Hospitals Coventry and Warwickshire (2002); University Hospital of North Staffordshire NHS Trust (2007). ***Annual average of daily swap rates:*** Thomson Reuters (2010).

The "within-period representativeness" of the data set returns on project cash flow is assessed by disaggregating the PFI programme into four periods. As Table 7.10 shows (overleaf), in the first period, the average spread in IRR over the long-dated swap rate among the seven data set projects that reached financial close is 3.04% - just 0.34% lower than the average spread among the eight comparator group contracts that reached financial close in this period. In the second period, the average spread among the two data set projects that reached financial close is 3.04% - 0.51% lower than that among the four comparator group contracts that were signed in this period. In the fourth period, the spread on the single data set project that reached financial close between 2006 and 2008 is 1.29% - less than 0.1% lower than that among the 13 comparator group contracts that were signed in this period. No data set projects signed in the third or fifth periods of the PFI programme.

To conclude, the average above-gilt return on 11 data set schemes is very similar to the average above-swap rate return for the comparator schemes. Thus, it appears that these schemes can be regarded as representative of the broader market within the period they were signed. However, it is evident from Figure 7.5 (above) and Table 7.10 (overleaf) that the average extent of the spread between Project IRR and the long-dated swap rate has declined over time. As a result, there is a 0.58% difference between the average above-swap spread on the data set projects versus that of comparator schemes. This suggests that the excess returns recorded in relation to the data set projects are representative of the market as a whole, but may be somewhat high in comparison with those on more recent schemes.

Table 7.10 Assessing "within-period" representativeness of findings on project returns

Period	Average spread on data set projects[i]	Average spread on comparator projects[ii]	Difference	Representativeness
1997-1999	3.04	2.70	-0.34	High
2000-2002	3.04	2.53	-0.51	High
2003-2005	n/a	2.62	n/a	n/a
2006-2008	1.29	1.37	0.08	High
2009-2010	n/a	3.41	n/a	n/a
1997-2010	*2.84*	*2.27*	*0.57*	*High*

[i] North Cumbria University Hospitals NHS Trust (1998); Norfolk & Norwich University Hospitals NHS Trust (2001); University Hospitals of North Durham NHS Trust (1998); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Lothian University Hospitals NHS Trust (1998); Nottingham University NHS Trust (1999); Royston, Buntingford and Bishop's Stortford PCT (2001); Hull & East Yorkshire NHS Trust (2001); Sandwell and West Birmingham Hospitals NHS Trust (2002); Hull & East Yorkshire NHS Trust (2006).
[ii] Department of Health (2009); Kingston Hospital NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2006); NHS Tayside (2003); Portsmouth Hospitals NHS Trust (2005); University College London Hospitals (2000); University Hospitals Coventry and Warwickshire (2002); University Hospital of North Staffordshire NHS Trust (2007).

However, there is a degree of complexity here. It should also be noted that Project IRR values are not held for projects that reached financial close in the period since April 2008. In other words, the impact of the financial crisis, which is conventionally traced to the collapse of Lehman Brothers in September 2008, is not considered in the above. However, as discussed earlier in this chapter, it is known that the average credit margin levied by PFI debt providers has increased significantly since this date when compared to the average in the years prior to the credit crunch (Hellowell 2010). This is very likely to have had an impact on the above-swap project rates of return in respect of projects that signed since the crisis.

7.5 Conclusion

The excess *returns* identified in this chapter represent excess *costs* to the NHS organisations involved. Even if it is assumed that these costs can be offset by private sector efficiencies in construction, maintenance and/ or service provision, they still represent an element of bad value for NHS commissioners. Regardless of the efficiencies generated in other parts of the contractual structure, it is evident that the cost efficiency of PFI investments would be enhanced if returns were brought into line with the “fair” rate of return represented by the cost of capital benchmarks. However, since there is in fact *no* evidence for the existence of offsetting efficiencies in the operational elements of the PFI (as demonstrated in Chapter 5), these excess costs have a significant bearing on the cost efficiency merits of the PFI model.

Returns to blended equity are especially high. In these terms, the most profitable project is the NHS Lothian - Edinburgh scheme, where the present value of revenue is, using the highest discount rate, six times higher than the present value of capital expenditure (i.e. the projected return on blended equity was worth £70.36 million at 2001 in present value terms when discounted at the higher cost of blended equity of 10.6%, on an investment of £11.3 million in present value terms). It will be recalled that the two sets of present values would be *equal* if the returns had been set at the "fair" rate – that is, the cost of blended equity.[92]

We might view the impact of these excess costs in two different ways. First, we may regard them as a source of higher than necessary unitary charges for NHS organisations. For example, had financing been available, not at the Project IRR, but at the Weighted Average Cost of Capital, then the unitary charges on each of the 11 projects would now be considerably lower (though it is not possible to quantify this difference with precision). This is an important issue since, as is discussed in Chapters 1 and 5, the costs faced by NHS organisations with operational PFI schemes have been shown by empirical research to be a major contributory source of financial difficulties for NHS organisations (Gaffney *et al* 1999; Shaoul *et al* 2008; PricewaterhouseCoopers 2005; Hellowell and Pollock 2009a; 2009b).

An alternative way to view excess costs is in terms of foregone opportunities for investment. The use of Benefit Cost Ratios in the assessment of Free Cash Flow to the Project is useful in this context. The BCR implies that, had a project been funded at the Weighted Average Cost of Capital, then for the same cost (in present value terms), the NHS could have secured the amount of capital which was actually raised *multiplied by the Benefit Cost Ratio*. For example, the BCR on the NHS Lothian – Edinburgh project was 1.69 (based on a WACC of 6.8%). This implies that this project is carrying an excess cost of capital equal to 69% of the cost of the investment – *after* consideration of the legitimate risk premium. In turn, this

[92] Where the return on a project is equal to the benchmark, the present value of the revenue cash-flow will equal the present value of the capital expenditure cash flow and the Benefit Cost Ratio will be 1.

suggests that NHS Lothian (or the broader NHS in the UK) could have secured 69% more capital than was actually raised for the project had financing been available at a “fair” rate.

8. Market structure and competitiveness

8.1 Introduction

This chapter examines the structure and competitiveness of the market for private finance in delivering new hospital infrastructure. As discussed in Chapter 4, theoretical and empirical research has shown that the structure of an industry can be a reliable source of data in predicting the degree of competitiveness within a market. This research has influenced the regulatory principles employed by anti-trust / competition authorities across much of the industrialised world (Baldwin *et al* 2010). For example, the UK Office of Fair Trading (OFT) (2004) cites three components of industry structure - concentration, entry/exit rates and contestability - as empirical indicators of market competitiveness. In this chapter, these indicators are populated with publicly available data, supplemented with data accessed from public authorities through the UK Freedom of Information Act (2000).

The chapter initially examines the extent of concentration and the entry/exit rates in the project finance markets for new NHS hospitals. Standard descriptive statistics for the degree of concentration in the markets for blended equity and senior debt are provided, and are evaluated according to contemporary UK regulatory principles. As discussed in Chapter 4, no single measure of concentration can be expected to capture all the relevant structural characteristics of an industry and thereby accurately predict its pricing behaviour (Singer 1968). Therefore, in addition to the degree of concentration, the rate of firm entry and exit, along with the rates of “churn” and turnover, are examined for PFI equity and debt markets.

In addition, as market share in the PFI industry is allocated to firms through a process of *procurement* – i.e. competition *for* the market as opposed to competition *in* the market – it is evident that the dynamics of public-private negotiations are also an important focus for the study (Klemperer 1999). Specifically, certain features of the procurement process - namely the magnitude of transaction costs, the number of bidders, and the extent of non-competitive bargaining in the final phase of bidding - will impact on its competitiveness.[93]

8.2 Approach to the analysis

8.21 Market definition

Market structure can only be evaluated once the borders of the market – in particular, what products and services it includes and excludes - have been determined. There are two important elements to defining a market (O'Brien 2009). First, the geographical unit of the market has to be decided. In this case, it has been assumed that the United Kingdom (incorporating all four NHS jurisdictions) provides the most appropriate geographical focus.

It should be recalled that the appropriate definition of "the market" is the institution in which the price, and thus the rate of return, is determined. Therefore, the relevant boundary is that which defines a geographical area in which a hypothetical oligopoly could acquire and exercise the power to set prices (Benitez and Estache 2005). For example,

[93] In focusing on both market structure and the process of procurement, the approach reflects that used by UK competition authorities, including the approach of the OFT, in relation to its methods for assessing the degree of competition in the markets for government and public sector procurement (*econ* 2004; Office of Fair Trading and Office of Government Commerce 2006). The OFT examines structure as a means of assessing whether there is a *prima facie* case for investigating the process of procurement. Where the structure of the market indicates that there are grounds for further investigation, this centres on the degree to which the characteristics of the procurement process can "moderate the market power of suppliers" (*econ* 2004, p. 140).

regulators may seek to determine the extent to which a fall in equity IRRs in Germany would affect IRRs in the UK. Technically, this is an empirical matter and a comprehensive resolution to the issue is beyond the scope of this thesis. However, it seems reasonable *a priori* to consider that firms which account for a significant proportion of capital investment in health sector PFI projects will be capable of influencing the terms on which that equity is provided.

However, it is important to recognise that the geographic market could have been defined more narrowly (e.g. on a jurisdiction-specific level), or more widely (e.g. on a European or global basis) and that the chosen definition will impact on the results. If the market is defined too broadly, it may be that the true degree of concentration is higher than the results suggest. By contrast, if the geographic market is too narrowly defined, results may give a false impression of high concentration and market rigidity. For example, where concentration is measured to be high relative to the total size of the UK market, it will be lower if measured on a European basis. Similarly, an industry with low rates of firm entry and exit on a UK basis will be assessed as more dynamic when measured at European level.

A second issue concerns the definition of the *product*. In this chapter, two products are the focus of examination: blended equity and senior debt (whether provided through loans by banks or through bonds 'wrapped' by monoline insurers).[94] In industrial organisation theory, product definition is governed by the concept of *substitutability* – i.e. the extent to which products being offered in this market are close substitutes for each another (O'Brien 2009).

[94] Monoline insurers are institutions that specialise in insuring bonds. By insuring a bond, a process called "wrapping", investors in the bond are guaranteed to receive all payments of interest and principal in accordance with a fixed schedule. The credit rating of the bond is enhanced to the level of the monocline insurer itself (i.e. "triple-A"), thus enabling a lower interest rate to be paid to bond-holders (Hellowell 2010).

The main approach to measuring substitutability is to ask how buyers might respond to a small but significant non-transitory increase in price (Benitez and Estache 2005). If a price increase of 5-10% for one product would likely result in purchasers switching to another, similar product, then both products can be regarded as being part of the same market.

Applying this to the products examined here, it is evident that price rises in different forms of equity might influence the choice between them. As discussed in Chapter 3, equity is provided in different forms, notably as "pure" equity (share capital) and loan stock (which normally functions as subordinated debt). The choice is often dictated by tax efficiency considerations and constraints on dividend-distribution, rather than by pricing *per se*, but these forms of equity could substitute for one another if a significant pricing discrepancy emerged. For example, a provider offering a lower cost form of equity would be able to provide a lower cost bid that would be more likely to be selected by purchasers. It therefore seems reasonable to regard all forms of equity as being provided within a single market.

The situation for senior debt is similar. Providers of different forms of senior debt are differentiated from one another in the sense that there are arrangers of bond finance (e.g. MBIA) that do not provide bank loans and banks that do not arrange bonds (e.g. Royal Bank of Scotland). However, these institutions operate in competition with one another, and the choice between the different forms of senior debt finance and different institutions is made largely on the basis of which will offer the interest rate (National Audit Office 2001).[95] Again, it seems reasonable to conclude that senior debt providers operate within a single market.

[95] At least, this choice existed until mid-2008, when the credit ratings of the main US monoline insurers were downgraded, bringing an abrupt end to the 'wrapped' bond market. Since this time, the senior debt element of all PFI hospital projects in the UK has financed by bank loans. This development is returned to in Chapter 9.

It is also clear that the markets for blended equity and debt are quite separate – i.e. provide different functions within a project finance structure – and are therefore non-substitutable.

8.22 Evaluating market concentration

In this chapter, concentration is defined as the degree to which the markets for equity and senior debt in the financing of UK hospital infrastructure are controlled by the largest institutions, defined with reference to market share. A simple count of the firms in a market has been undertaken. However, as is widely understood, this measure conveys very little information about the degree of concentration in the market, as it fails to take into account the distribution of market shares between firms (Competition Commission 2003). Therefore, the n-*firm concentration ratio*, as outlined in Chapter 6, provides the focus of evaluation.

The choice of n is essentially arbitrary, and varies between different researchers and in studies of different industries. In an analysis of concentration in 123 markets, the UK's Office for National Statistics used four-firm, five-firm and fifteen-firm concentration ratios (i.e. CR_4 CR_5 and CR_{15}). According to Pepall *et al* (2005), CR_4 and CR_8 are the most commonly used ratios among economists, industrial organisation scholars and anti-trust regulators in the United States. In an examination of the concentration of the UK construction sector, McCloughan (2004) used CR_5 ratios (and found a low level of concentration across the sector, from 5% for all trades, to 20% for civil engineers).[96] Similarly, in assessing the impact of UK government procurement practices on the competitiveness of supplier markets, a report commissioned by the Office of Fair Trading (*econ* 2004) also advised the use of CR_5.

[96] The construction industry would be the NHS's supplier base in the context of publicly financed procurement, so the finding that this sector is relatively non-concentrated is noteworthy. This is discussed further below.

As with the choice of ratio, the criteria for assessing the degree of concentration revealed by the ratio relies on qualitative analysis. There is no universally accepted basis on which an undesirable level of concentration is judged to be indicated through the n*-firm* measure. However, among competition regulators around the world, markets are conventionally regarded as oligopolies where the market has a CR_4 in excess of 40% (e.g. European Commission 2002, Office for National Statistics 2004, Shepherd 2005). In addition, in assessing the structure of government procurement markets, a report commissioned by the Office of Fair Trading (*econ* 2004) regards a CR_5 in excess of 40% as a "moderately high" level of concentration, providing "a *reasonable* indication of competition problems" (p. 179) [my emphasis]. A CR_5 in excess of 60%, meanwhile, is regarded by the as a "high" level of concentration, and "a *strong* indication of competition problems" (p. 179) [my emphasis].

In this chapter, CR_4 and CR_5 provide the key focus of evaluating concentration in the PFI equity and debt markets, following the practice of the Office for National Statistics and the Office of Fair Trading. However, given the diversity in regulatory practice, the market shares of all firms involved in the markets are recorded in the tables in results for each period. In addition, the results of Herfindhal Index (HI) analysis are also recorded. The HI varies between 0 and 10,000, with 0 indicating no concentration and 10,000 indicating complete monopoly of the market by a single firm. A high number is indicative of a high degree of concentration and a low number indicative of a greater degree of competition. Although there is no objective basis on which a given HI can be regarded as indicating high, medium or low concentration (Nawrocki and Carter 2009), changes in the HI scores across the different time periods provide a useful additional indicator of changes in concentration.

8.23 Evaluating the market's entry and exit dynamics

A firm with a large market share will not always be able to exert market power, as discussed in Chapter 4. Other features of the market - in particular, the presence or threatened presence of new market entrants - will provide a degree of countervailing purchaser power, impacting on a firm's ability to set prices (Bartelsman *et al* 2005; Competition Commission 2003). In addition to concentration, therefore, it is important to consider the *dynamics* of the market in terms of the extent to which firms are entering and exiting the market – the process known as "churn" among industrial organisation scholars (NIESR 2006; NERA 2004).

By focusing on the *churn rate* and the *entry penetration rate*, this chapter examines the extent to which market capacity has adapted to changes in demand and the extent to which new entrants have been able to provide a genuine degree of challenge to incumbent firms. As with concentration, there is no objective measure against which these rates can be evaluated. Advice to the OFT points to high churn and entry penetration rates as indicators of a market that has few barriers to entry, while low rates are viewed as necessary conditions for regulatory investigations into market competitiveness (*econ* 2004). However, the advice to the OFT does not provide quantitative benchmarks for evaluating churn or entry penetration. Instead, it is suggested that qualitative analysis, specific to the market being considered, is required. In the absence of such benchmarks, the evaluation of churn and penetration rates below inevitably involves an element of qualitative assessment.

8.24 Evaluating the competitiveness of the procurement process

As discussed in previous chapters, PFI contracts are allocated through a process of bidding and negotiation. The levels of market concentration and the rates of entry and exit will be determined to a significant extent by the procurement process and the extent to which it either facilitates or moderates the operation of market power by firms (OFT and OGC 2004). Barriers to entering the procurement process will undermine the degree of competition for contracts and may lead to a more concentrated market over time. As discussed in Chapter 6, barriers to entry are examined here by reference to the transaction costs incurred by firms in the bidding process. The scale of transaction costs for bidding consortia cannot be studied directly due to the commercially confidential nature of the relevant project-specific data.[97]

However, there is some evidence recorded in the FBCs of specific schemes which, for the sake of completeness, is worth recording here. For example, in the FBC of the £46 million St George Cardiothoracic and Neurosciences PFI project, which reached financial close in March 2000, the SPV's bidding costs are recorded as £2.1 million (or 4.58% of the project's capital value) (St George's Healthcare Trust 2000). In the FBC for a £375 million hospital for the University Hospital of North Staffordshire NHS Trust (2007, p. 155), which was signed off in June 2007, the SPV's bid costs are recorded as £11.8 million (or 3.1% of capital value).

In addition, the following table, extracted from the FBC of the £144 million North Middlesex Hospitals PFI project, which reached financial close in August 2007, shows the considerable number of advisory firms involved in the bidding process for one of the consortiums –

[97] The annual financial statements of some PLCs, however, do outline bidding costs at the aggregate level.

Bouygues and Canmore (North Middlesex University Hospitals NHS Trust 2007, p. 99). From this table, it is possible to identify some 13 distinct categories of advisory firm involved.

Table 8.1 Professional advisory firms involved in the bidding process for the North Middlesex Hospitals PFI project

	Bouygues	**Canmore**
Healthcare Planners	Rawlinson Kelly Whittelstone	Sterling Planning Advice
Legal Advisors	Berwin Leighton Paisner	Dundas & Wilson
Financial Advisors	Macquarie Bank	Operis
Equipping Advisors	Domino	UME
M&E Advisors	Faber Mansell	Capita
Cost Consultants	In-house	James Nisbett & Partners
Project Management	In-house	Capita
Structural Engineers	Terrell International	White Young Green
Traffic/Travel Advisors	Halcrow	-
Fire Consultants	Tenos	-
Insurance Advisors	Willis	Contractsure
Funders' Technical Advisor	Faithful & Gold	-
Employers Agent	-	Adams Consulting

Further, as has been noted by the National Audit Office (2007b), it would appear that in the phase of *exclusive* negotiation – the preferred bidder period – transaction costs for both bidders and public purchasers escalate rapidly. For example, in the FBC of Barts and The London's £1 billion hospital PFI project, it is outlined that the Skanska-Innisfree consortium estimated its preferred bidder transaction costs at £44 million – or 4.4% of capital value – relating to advisory costs and planning permission (Barts and the London NHS Trust 2006).

As noted in Chapter 5, the *Project Database* of Partnerships UK and the Full Business Cases of NHS organisations have been used to populate two indicators of barriers to market entry:

(1) *the length of the procurement process* (defined here as the time between the launch of the tender advertisement in the Official Journal of the European Union (OJEU) to the point of financial close, and broken down into two components - the competitive stage, in which there is more than one bidder, and the single bidder, or preferred bidder stage); and
(2) *the value of advisory costs for the NHS purchaser during the procurement process*.

In order to make a comprehensive assessment of procurement competitiveness, however, the literature points to two further elements of the procurement process that need to be evaluated. First, it is evident that the number of bidders during the non-exclusive phase of bidding (i.e. after initial bids are received and prior to the preferred bidder stage) is a matter of central importance for the competitiveness of the procurement process. Where the number of bidders is insufficient to ensure adequate competitive tension, bidders will be facilitated in setting their target rates of return above their costs of capital (Klemperer 1999; Hendricks and Paarsch 1995; Laffont 1997; McAfee and McMillan 1987, Milgrom 1989). Here, data extracted from the FBCs has been used to identify the number of bidders for each project. The number of bidders was recorded for four stages of competitive bidding (the final, preferred bidder stage, naturally involves only one bidder). These stages[98] are:

(1) the Pre-Qualification stage, which indicates the number of bidders to whom pre-qualification letters have been sent from the NHS purchaser;
(2) the Preliminary Invitation to Negotiate stage (equivalent to the first phase of Competitive Dialogue post-January 2006), at which point bidders are shortlisted;

[98] See Chapter 3 for a description of this process and the scope of bidder-purchaser negotiation involved.

(3) The Final Invitation to Negotiate stage, (equivalent to the final phase of Competitive Dialogue post-January 2006), at which point shortlisted bidders draft detailed bids);

(4) Best and Final Offer (or final bid, for schemes that reached financial close after March 2002), at which point the remaining bidders submit fully costed proposals.

The number of bidders responding to the Final Invitation to Negotiate provides the focus of analysis, as this is the point at which bidders are expected to provide detailed costings of project components, including their anticipated rate of return. As discussed in Chapter 5, there is no objective basis on which a given number of bidders can be regarded as sufficient for the maintenance of competition. In this analysis, following CEPA (2005) and the National Audit Office (2007b), and drawing on the auction theory literature outlined in Chapter 4, two or fewer bidders at the FITN stage is taken to be indicative of insufficient competition.

Where an exclusive period of negotiation exists, such that the discipline of competitive tension is absent over a long period, there is a question about whether the procurement process can be considered a competitive auction, or is instead a process of *bilateral monopoly bargaining* (Williamson 1985). If, for example, major changes are made to a project's output specification during this phase of procurement, Transaction Cost Economics would predict that firms may be able to set rates of return in their favour by imposing restraints on the negotiation process – the practice of 'hold-up' (Lonsdale and Watson 2007) discussed in Chapter 4. Below, this is examined with reference to the scope of changes in each project's output specification. Specifically, changes are examined quantitatively by examining the *value* of change, both in absolute terms, and as a proportion of the annual unitary charge to be levied by the SPV. Changes in contract length during the preferred bidder phase have also been examined as extensions to contract periods are indicators that a contract price has become unaffordable for the purchaser (National Audit Office 2007b). Extending the contract can ease the budget shortfall by reducing the rate of capital repayment. However, as with changes in output specification, when such increases occur during monopoly bargaining, this exposes purchasers to disadvantageous adjustments to the main components of the bid, including price, quality and the extent of risk transfer.

It should be re-emphasised that the section on the procurement process is of relevance to the assessment of competitiveness in *equity provision only*, as data is not available on the mechanisms by which senior debt finance is secured by SPVs on a project-specific basis. However, it is evident that the competitiveness of the procurement process will have a significant impact on the operation of the debt markets. A highly competitive procurement process, in which there is a realistic competitive threat from rivals, will force bidders to seek the lowest possible interest rates and the best debt terms in order to win contracts. Such discipline is likely to be absent, or present to a lesser extent, in an uncompetitive market.

8.3 Results

8.31 Concentration

Table 8.2 (overleaf) shows the number of equity and senior debt providers involved in the 123 signed contracts in this data set (that is, all UK NHS PFI projects with a capital value above £10 million that reached financial close up to and including May 2010). There are consistently more equity providers in the market throughout the period, reflecting the fact that most projects are financed by multiple equity providers but only one lead arranger.

The numbers of equity and debt providers are reasonably stable over the 14 year period, with a slight decrease in the number of equity providers (down from 43 in 1997-1999 to 36 in 2006-2010), and a slight increase in the number of senior debt providers (from 19 to 21). Full references to the FBCs from which the data for concentration and related measures have been drawn appear below. The data in tables 8.3 to 8.12 in this chapter have the same sources. Due to their large number, the references are not reproduced in those tables.

Table 8.2 Number of investors per time period and in total[i]

Period	Number of equity providers	Number of senior debt providers
1997-1999	43	19
2000-2002	35	17
2003-2005	38	21
2006-2010	36	21
1997-2010	*79*	*35*

[i] *Sources:* Partnerships UK (2010) for 25 schemes, and Full Business Cases for 98 additional schemes, in alphabetical order: Barnet & Chase Farm Hospital NHS Trust (1999); Barking, Havering & Redbridge Hospitals NHS Trust (2004); Barts and the London NHS Trust (2006); Berkshire Healthcare NHS Trust (2001); Brent PCT (2002); Brighton Health Care NHS Trust (2004); Bromley Healthcare NHS Trust (1998); Bro Morgannwg NHS Trust (2000); Buckinghamshire Hospitals NHS Trust (1997); Buckinghamshire Hospitals NHS Trust (2004); Calderdale Healthcare NHS Trust (1998); Cambridge University Hospital NHS Foundation Trust (2004); Cardiff and Vale NHS Trust (2000); Carlisle Hospitals NHS Trust (1997); Central Manchester Healthcare/Manchester Childrens NHS Trusts (2004); Dartford & Gravesham NHS Trust (1997); Dudley Group of Hospitals NHS Trust (2001); Dundee Healthcare NHS Trust (1999); East Lancashire Hospitals NHS Trust (2003a); East Lancashire Hospitals NHS Trust (2003b); East London and the City Mental Health NHS Trust (2004); Gwent Healthcare NHS Trust (1998); Hampshire PCT (2004); Hereford Hospitals NHS Trust (1999); Hull & East Yorkshire Hospitals NHS Trust (2000); Hull & East Yorkshire Hospitals NHS Trust (2006); Ipswich Hospital NHS Trust (2006); King's Healthcare NHS Trust (1999); Kingston Hospital NHS Trust (2004); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Leeds Teaching Hospitals NHS Trust (2002); Leeds Teaching Hospitals NHS Trust (2004); Lewisham Hospital NHS Trust (2004); Royal Infirmary of Edinburgh NHS Trust (1997); Maidstone and Tunbridge Wells NHS Trust (2008); Mid Essex Hospital Services NHS Trust (2007); Mid Devon Primary Care Trust (2002); Mid Essex Hospital Services NHS Trust (2007); Mid-Yorkshire Hospitals NHS Trust (2007); Newham Healthcare NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Ayrshire & Arran (2004), NHS Ayshire and Arran (2006); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Forth Valley (2007b); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2005b); NHS Greater Glasgow and Clyde (2006); NHS Tayside (2003); Norfolk and Norwich Healthcare Trust (1999), North Bristol NHS Trust (2009); Northamptonshire Teaching PCT (2005); Northgate and Prudhoe NHS Trust (2005); North Kirklees Primary Care Trust (2004); North Middlesex University Hospital NHS Trust (2007); Northumbria Healthcare (2000); Northumbria Healthcare (2001); North West London Hospitals NHS Trust (2003); Nottingham University Hospitals NHS Trust (1999); Oxford Radcliffe Hospitals NHS Trust (2003); Oxford Radcliffe Hospitals NHS Trust (2005); Peterborough & Stamford Hospitals NHS Foundation Trust (2007); Portsmouth Hospitals NHS Trust (2005); Queen Elizabeth Hospital NHS Trust (1998); Queen Mary's Hospital Sidcup NHS Trust (1998); Redcar and Cleveland Primary Care Trust (2008); Royston, Buntingford & Bishop's Stortford Primary Care Trust (2001); Salford Royal Hospitals NHS Trusts (2007); Salisbury Health Care NHS Trust (2003); Sandwell & West Birmingham Hospitals (2002); Sheffield Teaching Hospitals NHS Foundation Trust (2004); Sherwood Forest Hospitals NHS Trust (2005); Southern Derbyshire Acute Hospitals NHS Trust (2003); Southern General Hospital NHS Trust (1998); South Essex Partnership NHS Foundation Trust (2007); South Manchester University Hospitals NHS Trust (1998); South Tees Acute Hospitals NHS Trust (1999); Sperrin Lakeland Health & Social Services Trust (2008); St George's Hospital NHS Trust (2000); St Helen's and Knowsley Hospitals NHS Trust (2006); Sussex Partnership NHS Trust (1999); Swindon & Marlborough NHS Trust (1999); Tameside Hospital NHS Foundation Trust (2006); University College London Hospitals (2000); University Hospital Birmingham NHS Foundation Trust (2006); University Hospitals Coventry and Warwickshire (2002); University Hospital of North Durham NHS Trust (1998); University Hospital of North Durham NHS Trust (1999); University Hospital of North Durham NHS Trust (2002); University Hospital of North Staffordshire NHS Trust (2007); Walsall Hospitals NHS Trust (2007); Wandsworth; Richmond and Twickenham; and South West London and St George's Primary Care Trusts (2004); West Middlesex University Hospitals NHS Trust (2001), Whittington Hospital NHS Trust (2002).

8.32 Cumulative market shares and n-firm concentration ratios

(a) Equity (1997-1999)

Table 8.3 (overleaf) ranks equity providers on their share of the UK NHS PFI market over the period 1997-1999. The top four firms account for 39.58% of the market (CR_4 = 39.58%); and the top five firms 44.18% (CR_5 = 44.18%). These firms are Innisfree, Barclays, Royal Bank of Scotland, Balfour Beatty and Bank of Scotland. Thus, CR_4 falls less than one half of a percentage point *below* of the standard CR benchmark for oligopoly, while CR_5 falls more than 4% *above* the level which the OFT benchmark for “moderately high” concentration.

Table 8.3 **Equity providers in the UK NHS PFI market (1997-1999): market share rankings**

Rank	Firm	Market share (%)[i]	Market share[2]	Cumulative share (%)
1	Innisfree	16.94	287.06	16.94
2	Barclays	10.69	114.29	27.63
3	Royal Bank of Scotland	6.06	36.75	33.70
4	Balfour Beatty	5.88	34.58	39.58
5	Bank of Scotland	4.60	21.19	44.18
6	Carillion	4.15	17.22	48.33
7	Bovis Lend Lease	4.18	17.45	52.51
8	United Medical Enterprises	3.42	11.69	55.93
9	Sir Robert Macalpine	3.30	10.87	59.22
10	Sodexho	2.84	8.09	62.07
11	HSBC	2.72	7.40	64.79
12	Kvaerner	2.64	6.96	67.42
13	3i Group	2.17	4.71	69.59
14	Kier	1.87	3.49	71.46
15	AMEC	1.84	3.39	73.31
16	Interserve	1.84	3.39	75.14
17	Alfred MacAlpine	1.80	3.24	76.95
18	WS Atkins	1.80	3.24	78.75
19	John Laing (inc. Equion)	1.74	3.02	80.48
20	Skanska	1.57	2.48	82.06
21	Anglia Water	1.48	2.20	83.54
22	Taylor Woodrow	1.46	2.13	85.00
23	Societe Generale	1.40	1.95	86.39
24	Costain	1.39	1.93	87.79
25	ISS Mediclean	1.32	1.75	89.11
26	Mowlem	1.27	1.62	90.38
27	Mill Group	1.21	1.46	91.59
28	Noble Fund	0.90	0.80	92.49
29	Bouygues/Ecovert	0.89	0.79	93.38
30	Siemens	0.89	0.79	94.27
31	Ryhurst/Rydon	0.82	0.68	95.09
32	Health Care Development	0.63	0.40	95.72
33	RCO Holdings	0.60	0.36	96.32
34	Jarvis	0.55	0.30	96.87
35	Shepherd Construction	0.53	0.28	97.40
36	Robertson Group	0.45	0.21	97.85
37	Serco	0.43	0.19	98.29
38	Clugstons	0.37	0.14	98.66
39	London Financial Group	0.30	0.09	98.96
40	Ideal Cleaning Services	0.18	0.03	99.14
41	Quayle Munro	0.18	0.03	99.33
42	Dawn Construction	0.18	0.03	99.51
43	King Sturge	0.18	0.03	100
	Herfindahl Index		**618.71**	

[i] The size of the market in each period has been calculated using the government's database of signed projects - HM Treasury (2011a)

(b) Equity (2000-2002)

Table 8.4 (overleaf) ranks equity providers on their share of the UK NHS PFI market over the period 2000-2002. The top four firms account for 46.81% of the market (CR_4 = 46.81%); and the top five firms 52.82% of the market (i.e. CR_5 = 52.82%). These firms are Innisfree, Interserve, AMEC, Balfour Beatty and Noble Fund. Thus, the CR_4 is higher than the standard concentration ratio benchmark for oligopoly, while the CR_5 measure is well above the "moderately high" benchmark (indeed, it is only 7.18% below the "high" benchmark).

Table 8.4 Equity providers in the UK NHS PFI market (2000-2002): market share rankings				
Rank	Firm	Market share	Market share^2	Cumulative market share
1	Innisfree	18.29	334.58	18.29
2	Interserve	11.42	130.38	29.71
3	AMEC	8.59	73.78	38.30
4	Balfour Beatty	8.51	72.46	46.81
5	Noble Fund	6.01	36.07	52.82
6	Skanska	5.79	33.54	58.61
7	HSBC	5.55	30.76	64.16
8	Bank of Scotland	4.65	21.65	68.80
9	Bilfinger Berger	3.30	10.89	72.11
10	Jarvis	2.93	8.61	75.04
11	Bradford/Northern Housing	2.87	8.25	77.92
12	PFI Investors Limited	2.79	7.78	80.71
13	Kier	1.89	3.55	82.59
14	Bouygues/Ecovert	1.87	3.50	84.46
15	Mill Group	1.77	3.14	86.23
16	Barclays	1.70	2.88	87.93
17	Bovis Lend Lease	1.68	2.83	89.61
18	Impregilo	1.45	2.09	91.06
19	Ryhurst/Rydon	1.13	1.28	92.19
20	John Laing	1.10	1.21	93.29
21	Tilbury Douglas	1.01	1.02	94.30
22	United Medical Enterprises	0.99	0.99	95.29
23	Canmore Partnership	0.57	0.32	95.86
24	Anglia Water (AWG)	0.57	0.32	96.42
25	Group 4	0.57	0.32	96.99
26	HBG	0.43	0.18	97.42
27	MJ Gleeson	0.39	0.15	97.81
28	Carillion	0.34	0.11	98.15
29	Macob Construction Ltd	0.33	0.11	98.47
30	McBains Investment	0.32	0.10	98.79
31	ROK Property	0.32	0.10	99.11
32	Interior	0.32	0.10	99.34
33	Westbourne Property	0.32	0.10	99.56
34	Robertson Group	0.31	0.09	99.84
35	PFI Infrastructure Company	0.12	0.01	99.96
36	SSL	0.04	0.0016	100
	Herfindahl Index		**793.28**	

(c) Equity (2003-2005)

Table 8.5 (overleaf) ranks equity providers by share of the UK NHS PFI market during the period 2003-2005. The top four firms account for 41.51% of the market (CR_4 = 41.51%); and the top five firms 48.4% of the market (i.e. CR_5 = 48.4%). These firms are Bovis Lend lease, Innisfree, Bank of Scotland, Carilllion and Skanska. Thus, though concentration has reduced on the previous period, CR_4 remains higher than the standard concentration ratio benchmark for oligopoly, while CR_5 measure is well above "moderately high" benchmark.

Table 8.5 Equity providers in the UK NHS PFI market (2003-2005): market share rankings

Rank	Firm	Market share	Market share^2	Cumulative market share
1	Bovis Lend Lease	15.56	242.03	15.56
2	Innisfree	11.41	130.21	26.97
3	Bank of Scotland	7.30	53.34	34.27
4	Carillion	7.24	52.46	41.51
5	Skanska	6.93	47.98	48.44
6	HSBC	6.34	40.20	54.78
7	Sodexho	6.06	36.76	60.84
8	John Laing (inc. Equion)	5.59	31.22	66.43
9	Commonwealth Bank of Australia	3.44	11.82	69.87
10	Royal Bank of Scotland	3.39	11.50	73.26
11	Barclays	3.25	10.57	76.51
12	Ryhurst/Rydon	2.90	8.43	79.42
13	United Medical Enterprises	2.42	5.85	81.84
14	Bouygues/Ecovert	1.98	3.93	83.82
15	Interserve	1.72	2.95	85.54
16	Balfour Beatty	1.58	2.50	87.12
17	Impregilo	1.48	2.20	88.60
18	Alfred MacAlpine	1.23	1.51	89.83
19	Robertson Group	1.19	1.42	91.02
20	NIB Capital	1.09	1.19	92.11
21	Mowlem	1.03	1.07	93.15
22	Kajima	1.02	1.04	94.17
23	Chiltern Securities	0.78	0.60	94.94
24	Global Solutions Limited	0.74	0.55	95.68
25	Noble Fund	0.55	0.30	96.24
26	Mill Group	0.46	0.21	96.70
27	Quayle Munro	0.39	0.15	97.09
28	Costain	0.38	0.14	97.47
29	PFI Infrastructure Company	0.38	0.14	97.85
30	MJ Gleeson	0.28	0.08	98.12
31	Canmore Partnership	0.24	0.06	98.36
32	Allied Irish Bank	0.19	0.03	98.55
33	Dawn Construction	0.19	0.03	98.74
34	Staveley Industries	0.17	0.03	98.91
35	Westwind Capital	0.17	0.03	99.08
36	Building Design Partnership	0.17	0.03	99.35
37	Mackenzie Investments	0.14	0.02	99.40
38	FES Limited	0.06	0.003	100
	Herfindahl Index		**702.63**	

(d) Equity (2006-2010)

Table 8.6 (overleaf) ranks equity providers by share of the UK NHS PFI market during the period 2006-2010. The top four firms account for 48.31% of the market (CR_4 = 48.31%); and the top five firms 56.47% of the market (CR_5 = 56.47%). These firms are John Laing plc, Innisfree, Balfour Beatty, HSBC and Skanska. As in the previous three periods, the CR_4 is indicative of oligopoly while the CR_5 indicates “moderately high” concentration during this final period.

Table 8.6 Equity providers in the UK NHS PFI market (2006-2010): market share rankings

Rank	Firm	Market share	Market share^2	Cumulative market share
1	John Laing (inc. Equion)	15.01	225.32	15.01
2	Innisfree	11.54	133.18	26.55
3	Balfour Beatty	11.03	121.74	37.58
4	HSBC	10.72	114.98	48.31
5	Skanska	8.16	66.59	56.47
6	Royal Bank of Scotland	6.47	41.92	62.94
7	Macquarie	4.18	17.45	67.12
8	Bank of Scotland	3.72	13.85	70.84
9	Carillion	3.72	13.84	74.56
10	Commonwealth Bank of Australia	3.57	12.74	78.13
11	Interserve	3.28	10.75	81.41
12	Taylor Woodrow	3.00	8.97	84.40
13	Multiplex	1.80	3.20	86.19
14	Sodexho	1.67	2.77	87.86
15	Fomento de Construcciones Contratas	1.55	2.41	89.41
16	Grosvenor House	1.10	1.21	90.51
17	Allied Irish Bank	0.97	0.95	91.48
18	Barclays	0.79	0.62	92.22
19	United Medical Enterprises	0.79	0.62	93.06
20	PFI Infrastructure Company	0.79	0.62	93.86
21	Bouygues/Ecovert	0.78	0.61	94.64
22	Mill Group	0.64	0.41	95.27
23	Costain	0.58	0.33	95.85
24	Alfred Macalpine	0.58	0.33	96.43
25	Morrison Construction	0.48	0.23	96.91
26	Kier	0.32	0.10	97.23
27	Robertson Group	0.32	0.10	97.55
28	Robert Macalpine	0.27	0.07	97.81
29	Ryhurst/Rydon	0.27	0.07	98.08
30	Kajima	0.27	0.07	98.35
31	Shepherd Construction	0.24	0.06	98.58
32	P. Ellio & Company	0.20	0.04	98.78
33	Integral	0.09	0.01	98.87
34	Westwind Capital	0.09	0.01	99.01
35	James Nesbitt	0.09	0.01	100
	Herfindahl Index		**796.19**	

(e) Equity (1997-2010): summary of results on concentration

From the above, it is evident that the market for equity providers in UK NHS PFI projects is an oligopoly with at least a moderately high level of concentration in each period. It is also notable that the trend is towards higher concentration on both CR_4 and CR_5 measures. On the CR_4 the level of concentration increases from 39.58% in 1997-1999 to 48.31% in 2006-2010. Only in the first period does the CR_4 fall short (by 0.42%) of the oligopoly level. On the CR_5, concentration increases from 44.18% to 56.47% between the first and final periods. The CR_5 is significantly above 40% in each of the periods, suggesting "moderately high" concentration. Given the increase in concentration over time (a trend that is also reflected in HI, which increase from to 0619 to 0796 between the first and final periods),[99] this is *indicative of competition problems* on the OFT criteria. The results are summarised below.

Table 8.7 Summary results for the *n*-firm concentration of the UK NHS PFI equity market

Period[100]	4-firm concentration ratio (%)	5-firm concentration ratio (%)
1997-1999	39.58	44.18
2000-2002	46.81	52.82
2003-2005	41.51	48.44
2006-2010	48.31	56.47

[99] The relatively high HI score of 793 in 2000-02 reflects the increase in concentration compared with the previous and subsequent period *and* the asymmetry of market shares between the dominant players.

[100] As explained in Chapter 6 (section 6.31, p.164), market concentration is generally measured on the basis of *annual* sales. However, in the author's view, an annual analysis may provide a misleadingly high estimate of concentration in the PFI hospital sector because of the relative infrequency of transactions. Here, the analysis focuses on measuring market shares within three tri-annual periods and one five-year period, thereby disaggregating the projects into four groups that are roughly equal in number. In addition, across the 13-year period, the share of the market accounted for by the top five firms (Innisfree, Carillion, Balfour Beatty, John Laing and Halifax Bank of Scotland) is 41% - which is indicative of a *moderately concentrated* oligopoly. While this measure arguably overstates the degree of competitive challenge in the market, and fails to give an account of the increased degree of concentration over time, it does underline the extent to which the market's dominant players have been able to retain their influence within the market over an extended period of time.

(i) Senior debt (1997-1999)

Table 8.8 (overleaf) ranks senior debt providers by share of the UK NHS PFI market during the period 1997-1999. The top four firms account for 49.79% of the market (CR_4 = 49.79%); and the top five firms 58.19% of the market (CR_5 = 59.2%). These firms are Lloyds, Barclays, Greenwich Natwest, Halifax Bank of Scotland and Royal Bank of Scotland. The CR_4 measure of concentration is, at 49.8%, well above the standard benchmark for oligopoly, while the CR_5 of 58% is above the benchmark indicative of "moderately high" market concentration.

Table 8.8 Senior debt providers in the UK NHS PFI market (1997-1999): market share rankings

Rank	Firm	Market share	Market share^2	Cumulative market share
1	Lloyds	14.37	206.46	14.37
2	Barclays	13.36	178.36	27.72
3	Greenwich Natwest	12.09	146.16	39.81
4	(Halifax) Bank of Scotland	9.98	99.51	49.79
5	Royal Bank of Scotland	8.41	70.68	58.2
6	ABN Amro	7.09	50.22	65.28
7	AMBAC	7.09	50.24	72.37
8	Dresdner Kleinwort Bensen	4.09	16.77	76.47
9	Deutsche Bank	4.42	19.57	80.89
10	Rabobank	3.29	10.85	84.18
11	Dexia	2.66	7.05	86.84
12	(D)NIB Capital	2.66	7.05	89.49
13	HSBC	2.17	4.71	91.67
14	Societe Generale	2.17	4.71	93.84
15	BNP Paribas	1.62	2.63	95.46
16	Sumitomo Mitsui Banking Corporation	1.54	2.37	97.00
17	Chase Manhattan	1.21	1.46	98.21
18	Berliner Bank	1.17	1.37	99.38
19	Unknown	0.62	0.37	100
	Herfindahl Index		**880.55**	

(ii) Senior debt (2000-2002)

Table 8.9 (overleaf) ranks senior debt providers by share of the UK NHS PFI market during the period 2000-2002. The top four firms account for 67.18% of the market (CR_4 = 67.18%); and the top five firms 71.36% (CR_5 = 71.36%) of the market. These firms are Abbey National, BNP Paribas, Bank of Scotland, Lloyds and AMBAC. The CR_4 measure of concentration is more than 27 percentage points above the benchmark for oligopoly, while the CR_5 is more than 11 percentage points above the minimum level indicative of "high" concentration. Indeed, it is evident that in this period the market was dominated to a remarkable degree by two banks – Abbey National and BNP Paribas - with 53% of the market between them.

Table 8.9 Senior debt providers in the UK NHS PFI market (2000-2002): market share rankings

Rank	Firm	Market share	Market share^2	Cumulative market share
1	Abbey National	29.46	868.02	29.4621
2	BNP Paribas	24.08	580.00	53.54523
3	Bank of Scotland	8.19	67.09	61.73594
4	Lloyds	5.44	29.59	67.17604
5	AMBAC	4.19	17.53	71.36308
6	European Investment Bank	4.19	17.53	75.55012
7	Greenwich Natwest	4.03	16.28	79.58435
8	Barclays	3.18	10.10	82.76284
9	DEPFA BANK	3.03	9.15	85.78851
10	Dexia	2.26	5.11	88.05012
11	Royal Bank of Scotland	2.23	4.98	90.28117
12	Unknown	2.02	4.07	92.29829
13	Heleba	1.96	3.83	94.25428
14	Dresdner Kleinwort Bensen	1.34	1.81	95.59902
15	Nationwide	1.16	1.35	96.76039
16	Sumitomo Mitsui Banking Corporation	0.86	0.73	97.61614
17	Bank of Wales	0.49	0.24	98.10513
	Herfindahl Index		**1637.41**	

(iii) Senior debt (2003-2005)

Table 8.10 (overleaf) ranks senior debt providers by share of the UK NHS PFI market during the period 2003-2005. The top four firms account for 51.13% of the market (CR_4 = 51.13%); and the top five firms 61.34% (CR_5 = 61.34%) of the market. These firms are Deutsche Bank, (Halifax) Bank of Scotland, Royal Bank of Canada, the European Investment Bank and FSA. Though the market shares of the largest firms in this period are lower than in the previous period, the CR_4 measure of 51.13% is still 11 percentage points above the benchmark for oligopoly, while the CR_5 is slightly above the level indicative of "high" market concentration.

Table 8.10 Senior debt providers in the UK NHS PFI market (2003-2005): market share rankings				
Rank	**Firm**	**Market share**	**Market share^2**	**Cumulative market share**
1	Deutsche Bank	17.69	312.98	17.69
2	(Halifax) Bank of Scotland	11.61	134.84	29.30
3	Royal Bank of Canada	11.05	122.14	40.36
4	European Investment Bank	10.78	116.18	51.13
5	FSA	10.20	104.12	61.34
6	BNP Paribas	4.48	20.11	65.82
7	MBIA	4.48	20.11	70.31
8	Dexia	4.27	18.19	74.57
9	Sumitomo Mitsui Banking Corporation	4.23	17.85	78.80
10	Barclays	3.23	10.46	82.03
11	(D)NIB Capital	3.13	9.82	85.16
12	Royal Bank of Scotland	2.47	6.11	87.63
13	Dresdner Kleinwort Bensen	1.98	3.93	89.62
14	DEPFA	1.93	3.71	91.54
15	AMBAC	1.58	2.50	93.12
16	Prudential	1.58	2.50	94.71
17	Nationwide	1.19	1.42	95.90
18	General Practice Finance Corporation	0.78	0.60	96.67
19	Bank of Ireland	0.69	0.48	97.36
20	Unknown	0.55	0.30	97.92
21	Norwich Union PPP	0.46	0.21	98.38
	Herfindahl Index		**908.55**	

(iv) Senior debt (2006-2010)

Table 8.11 (overleaf) ranks senior debt providers by share of the UK NHS PFI market during the period 2006-2010. The top four firms account for 49.92% of the market (CR_4 = 49.92%); and the top five firms 58.15% (CR_5 = 58.15%) of the market. These firms are Royal Bank of Scotland, European Investment Bank, (Halifax) Bank of Scotland, HSBC and Barclays. This CR_4 measure is 10 percentage points above the benchmark for oligopoly, while the CR_5 indicates moderately high concentration, being almost two percentage points below the level indicating "high" concentration. The reduction in the level of concentration in the market compared to the previous period reflects changes in the structure of the market resulting from the financial crisis (Hellowell 2010), which is discussed in detail in Chapter 9.

Table 8.11 Senior debt providers in the UK NHS PFI market (2006-2010): market share rankings				
Rank	**Firm**	**Market share**	**Market share^2**	**Cumulative market share**
1	Royal Bank of Scotland	15.33	235.08	15.33
2	European Investment Bank	13.37	178.82	28.70
3	(Halifax) Bank of Scotland	12.23	149.65	40.94
4	HSBC	8.99	80.75	49.92
5	Barclays	8.22	67.61	58.15
6	ABN Amro	7.16	51.22	65.31
7	Deutsche Bank	5.91	34.97	71.22
8	Royal Bank of Canada	6.56	43.06	77.78
9	Morgan Stanley	5.91	34.97	83.69
10	Dresdner Kleinwort Bensen	4.28	18.32	87.97
11	(D)NIB Capital	1.15	1.33	89.13
12	Dexia	1.12	1.25	90.25
13	Societe Generale	1.06	1.13	91.31
14	Credit Agricole	1.06	1.13	92.37
15	National Australia Bank	1.06	1.13	93.43
16	DEPFA Bank	1.06	1.13	94.50
17	Lloyds	1.06	1.13	95.56
18	Bank of Ireland	0.99	0.99	96.55
19	Norddeutsche Landesbank	0.99	0.99	97.55
20	Unknown	0.99	0.41	98.19
21	Sumitomo Mitsui Banking Corp.	0.99	0.28	100
	Herfindahl Index		**905.35**	

(v) Senior debt: Summary of results

There is no consistent trend in the degree of market concentration for senior debt provision in UK NHS PFI projects. There is in three of the periods considerable stability in concentration on both CR_4 and CR_5 measures, with CR_4 generally close to 50% (indicating oligopoly) and CR_5 around 60% (indicating *moderately high* to *high* concentration). The exception is in the period 2000-2002, when the dominance of Abbey National and BNP Paribas led to higher concentration on CR_4 and CR_5. This is also reflected in the exceptionally high HI score (of 1637) in that period.[101] In addition, the level of concentration is moderated during the final period, during which the global financial crisis took place with a major impact on banks and other lenders. Summary data are presented in Table 8.12 (below).

Table 8.12 Summary results for the n-firm concentration of the senior debt market

Period[102]	4-firm concentration ratio (%)	5-firm concentration ratio (%)
1997-1999	49.79	58.2
2000-2002	67.18	71.36
2003-2005	51.13	61.34
2006-2010	49.92	58.15

8.33 Entry, exit rates, churn and market penetration

(a) Equity

Table 8.13 (overleaf) shows entry, exit, turnover, churn and market penetration rates for the UK PFI hospital market between 1997 and 2010. The degree of turnover between the first and second periods (1997-1999 and 2000-2002) is high, with high rates of entry (37%) and exit (23%). The turnover rate is 80%, indicating a very dynamic market on this measure. However, the churn rate is negative, at - 0.16. This is because the number of firms entering the market was more than offset by exitors, such that overall diversity of supply diminished

[101] It will be recalled from the discussion of concentration measures in Chapter 6 that the HI will provide a significantly higher indication of concentration for a market with one dominant firm and three or four small firms than a market containing four or five dominant firms in which the share of sales is more equally divided.

[102] Across the 13-year period, the share of the market accounted for by the top five firms (European Investment Bank, Halifax Bank of Scotland, Royal Bank of Scotland, Barclays and Royal Bank of Canada) is 43%. Although this ratio is lower than any of the period-specific ratios, it is still indicative of a *moderately concentrated* oligopoly. This underlines the extent to which the market's dominant players have been able to retain their influence in the market over an extended period, despite the relatively high rate of turnover discussed above.

between the periods. In addition, firms entering the market in 2000-2002 were able to secure only a small proportion of the market, with a combined market share of just 15.5%. Between 2000-2002 and 2003-2005, the total capital value of the market increased by more than 100%, from £1.6 billion to £3.48 billion (see Table 8.1 above). This increase was accompanied by an entry rate of some 50%, but this was substantially offset by firms exiting the market, giving an overall churn rate of 0.06%. The turnover rate was 99%, indicating a very fluid market. However, as in the previous period, new entrants were unable to secure a significant proportion of market share, with a combined penetration rate of only 20.6%.

Between 2003-05 and 2006-2010, the size of the market increased by more than 60% in comparison with the previous period (from £3.48 billion to £5.6 billion) but the entry rate reduced to 32%, while the exit rate was 39%. The turnover rate was once again high, at 71%, implying a very fluid market. However, the churn rate was slightly negative, at - 0.08%. Market entry penetration was also down in this period, with new entrants capturing just 13.2% of market share, suggesting a limited impact on the degree of competitive challenge.

Table 8.13 Equity market (1997-2010): Entry, exit, turnover, churn and market penetration rates	
1997-99 to 2000-02	
Number of firms in 1997-1999	43
Number of entrants	16
Entry rate	***0.37***
Number of exits	23
Exit rate	***0.53***
Turnover rate	***0.80***
Entrants minus exits	-7
Churn	***- 0.16***
Market penetration	***15.15%***
2000-02 to 2003-05	
Number of firms in 2000-2002	36
Number of entrants	18
Entry rate	***0.5***
Number of exits	16
Exit rate	***0.44***
Turnover rate	***0.99***
Entrants minus exits	2
Churn	***0.06***
Market penetration	***20.6%***
2003-05 to 2006-10	
Number of firms in 2003-05	38
Number of entrants	12
Entry rate	***0.32***
Number of exits	15
Exit rate	***0.39***
Turnover rate	***0.71***
Entrants minus exits	-3
Churn	***-0.07895***
Market penetration	***13.29%***

(b) Senior debt

Table 8.14 (overleaf) shows entry, exit, turnover, churn and market penetration rates for the UK PFI hospitals market across the four periods from 1997-2010. The degree of turnover between the first and second periods (1997-1999 and 2000-2002) is substantial, with high rates of both entry (32%) and exit (37%). The turnover rate is 69%, indicating a dynamic market. However, the churn rate is negative, at -0.05%, demonstrating that the overall level of competitiveness, in terms of the number of firms in the market, decreased over this period due to the number of firms exiting the market. It is notable though that the six firms entering the market in 2000-2002 secured a high market penetration rate, of some 40.28%.

Between 2000-2002 and 2003-2005, as the total capital value of the market increased by more than 100%, the entry rate increased to 53%. The turnover rate was 82%, indicating a very fluid market. However, entry was substantially offset by firms exiting the market, giving an overall churn rate of just 0.23%. Firms entering the market in 2000-2002 were able to secure a substantial proportion of the market, with a combined penetration rate of 50.07%.

Between 2003-05 and 2006-2010, the size of the market increased by more than 60% in capital value terms and this was accompanied by an entry rate of 38%. However, this was cancelled out by an exit rate of 38%, resulting in a churn rate of exactly 0%. The turnover rate was 74%, but penetration was low in comparison with previous periods, at 27.3%.

Table 8.14 Senior debt market 1997-2010: Entry, exit, turnover, churn and market penetration rates	
1997-99 to 2000-02	
Number of firms in 1997-1999	19
Number of entrants	6
Entry rate	***0.32***
Number of exits	7
Exit rate	***0.37***
Turnover rate	***0.69***
Entrants minus exits	-1
Churn	***- 0.05***
Market penetration	***40.28%***
2000-02 to 2003-05	
Number of firms in 2000-2002	17
Number of entrants	9
Entry rate	***0.53***
Number of exits	5
Exit rate	***0.29***
Turnover rate	***0.82***
Entrants minus exits	4
Churn	***0.23***
Market penetration	***50.07%***
2003-05 to 2006-10	
Number of firms in 2003-05	21
Number of entrants	8
Entry rate	***0.38***
Number of exits	8
Exit rate	***0.38***
Turnover rate	***0.74***
Entrants minus exits	0
Churn	***0***
Market penetration	***27.30%***

(c) Summary of results for entry and exit

Across the equity and senior debt markets, the rate of turnover was high. For equity, the average turnover rate was some 83%, indicating a market in which equity providers are able to enter and exit the market with considerable freedom. For senior debt, the average turnover rate was 75%, indicating a very dynamic market. However, a prominent feature of both markets is the very low levels of *net* entry. Despite the significant increase in the size of the market (in capital value terms) over the 14 year period, churn rates are low, with the average churn rate for equity actually negative, at - 0.06%, while the average churn rate for senior debt was just positive, at 0.06%. In other words, there has been considerable stability in the number of firms involved in both the equity and debt markets across the periods, despite the high turnover of firms and the increase in the value of the market over time.

The two markets (equity and senior debt) differ significantly with respect to market entry penetration rates. For equity, this averaged 16.35%, suggesting that although firms were able to enter the market, they were unable to offer a serious degree of competitive challenge to incumbents. For debt, market penetration across the periods averaged at 39.22%, suggesting the barriers to entrants in this market were lower, and that firms could move into the debt market and offer a higher degree of genuine challenge to incumbents. However, the proportion of debt provided by new entrants reduced significantly over time.

8.34 The procurement process

(i) Length and shape of procurement process

Figure 8.1 (overleaf) shows mean procurement times for projects that reached financial close in each year since 1997, using data on the overall length of the procurement process from the *Projects Database* of Partnerships UK (2010). The red trend line shows that the average procurement time for projects has decreased slightly over the 14 year period. However, some caution is required in the assessment of results in the final three years due to the small number of schemes reaching financial close. If the data are instead grouped into four periods, with each group accounting for roughly 25 projects, there is no consistent reduction in procurement times. Procurement for projects reaching financial close between 1997 and 1999 lasted on average 40.6 months; between 2000 and 2002, the figure was 42.8 months; between 2003 and 2005 37.2 months; and between 2006 and 2010 42.3 months.

The project with the shortest overall procurement was Kirklees Primary Care Trust's £74 million scheme, which reached financial close in April 2004 after a period of 15 months. The longest procurement was for NHS Greater Glasgow's £17.9 million Local Forensic Psychiatric Unit (Stobhill) scheme, which was financially closed in July 2005 after a period of 70 months.

Figure 8.1 Mean procurement periods for UK PFI hospitals (n=107)

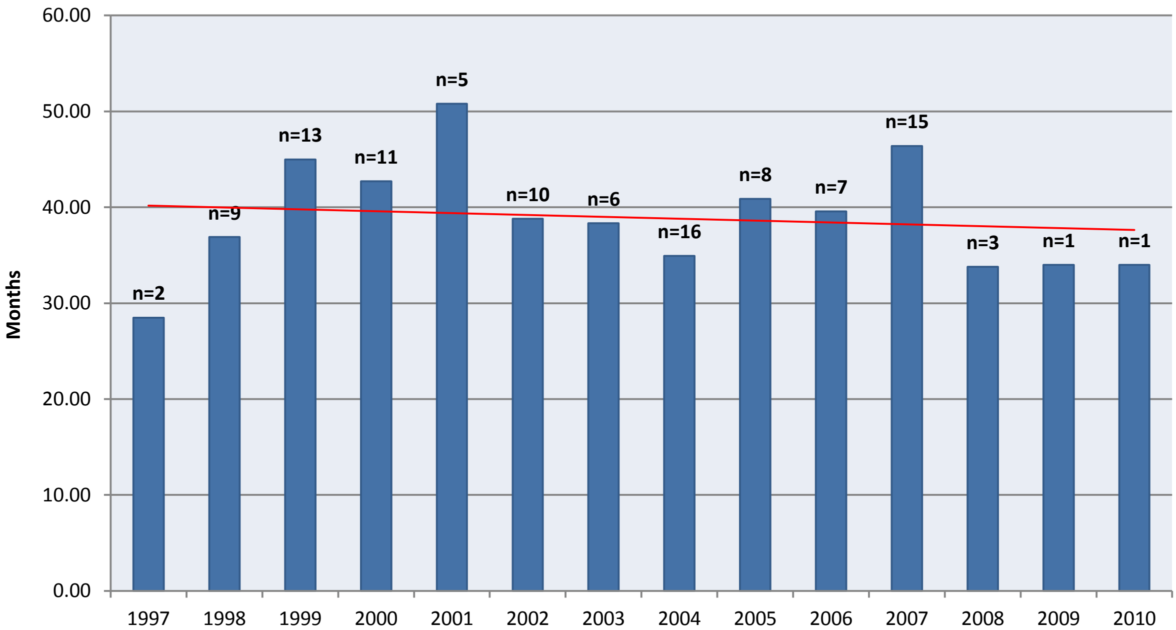


Table 8.15 (on p. 255) presents the results from an examination of the more detailed *phase-specific* data provided by the Full Business Cases of 61 PFI projects. These data enable the lengths of the competitive and preferred bidder phases of procurement to be examined. In the table, they are grouped into four time periods in order to identify the trend over time.

On average, the phase of exclusive negotiations between an NHS purchaser and the preferred bidder took 21 months, almost three months longer than the competitive phase preceding it. In all periods, the average length of the exclusive bidding phase of procurement was longer than the average length of the competitive phase. As with the larger data set discussed above, there is no consistent pattern in respect of procurement times, with considerable stability over the period. The length of the competitive stage of procurement appears to have increased slightly over time, while the length of the preferred bidder period has decreased slightly. This decrease was particularly marked for schemes that reached financial close in the years 2008, 2009 and 2010. Indeed, for these schemes, the average period of competitive procurement was higher than during other periods, at 22.2 months. However, the average preferred bidder period was reduced to 12 months.

While these averages need to be regarded with some caution due to the small number of projects – only five reached close in these years – this is early evidence that the change in the procurement process discussed in Chapter 3 has had an impact on the pattern of PFI procurement. It is evident, however, that the preferred bidder period remains extensive.

Table 8.15 The length of competitive procurement, non-competitive procurement and the process overall			
Period	Average length of competitive procurement (months)	Average length of preferred bidder period (months)	Average length of procurement process (months)
1997-1999 (n=7)[i]	14.43	25.43	37.14
2000-2002 (n=13)[ii]	11.33	19.00	30.33
2003-2005 (n=21)[iii]	19.10	19.14	38.24
2006-2010 (n=20)[iv]	20.20	21.70	41.90
1997-2010 (n=61)	*18.24*	*20.95*	*39.19*

[i] Carlisle Hospitals NHS Trust (1997); Dundee Healthcare NHS Trust (1999); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Royal Infirmary of Edinburgh NHS Trust (1997); University Hospital of North Durham NHS Trust (1998); University Hospital of North Durham NHS Trust (1999)
[ii] Berkshire Healthcare NHS Trust (2001); Bro Morgannwg NHS Trust (2000); Cardiff and Vale NHS Trust (2000); Dudley Group of Hospitals NHS Trust (2001); Hull & East Yorkshire Hospitals NHS Trust (2000); Mid Devon Primary Care Trust (2002); Northumbria Healthcare (2000); Northumbria Healthcare (2001); Royston, Buntingford & Bishop's Stortford Primary Care Trust (2001); Sandwell & West Birmingham Hospitals (2002); University Hospital of North Durham NHS Trust (2002); West Middlesex University Hospitals NHS Trust (2001); Whittington Hospital NHS Trust (2002).
[iii] Barking, Havering & Redbridge Hospitals NHS Trust (2004); Brighton Health Care NHS Trust (2004); Cambridge University Hospital NHS Foundation Trust (2004); Central Manchester Healthcare/Manchester Childrens NHS Trusts (2004); East Lancashire Hospitals NHS Trust (2003a); East London and the City Mental Health NHS Trust (2004); Kingston Hospital NHS Trust (2004); Newham Healthcare NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2005b); NHS Tayside (2003); Northamptonshire Teaching PCT (2005); Northgate and Prudhoe NHS Trust (2005); North Kirklees Primary Care Trust (2004); North West London Hospitals NHS Trust (2003); Oxford Radcliffe Hospitals NHS Trust (2003); Oxford Radcliffe Hospitals NHS Trust (2005); Portsmouth Hospitals NHS Trust (2005); Salisbury Health Care NHS Trust (2003); Sherwood Forest Hospitals NHS Trust (2005); Southern Derbyshire Acute Hospitals NHS Trust (2003).
[iv] Barts and the London NHS Trust (2006); Hull & East Yorkshire Hospitals NHS Trust (2006); Ipswich Hospital NHS Trust (2006); Maidstone and Tunbridge Wells NHS Trust (2008); Mid Essex Hospital Services NHS Trust (2007a); Mid Essex Hospital Services NHS Trust (2007b); Mid-Yorkshire Hospitals NHS Trust (2007); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Forth Valley (2007b); NHS Greater Glasgow and Clyde (2006); North Bristol NHS Trust (2009); Peterborough & Stamford Hospitals NHS Foundation Trust (2007); Redcar and Cleveland Primary Care Trust (2008); Salford Royal Hospitals NHS Trusts (2007); Sperrin Lakeland Health & Social Services Trust (2008); St Helen's and Knowsley Hospitals NHS Trust (2006); Tameside Hospital NHS Foundation Trust (2006); University Hospital Birmingham NHS Foundation Trust (2006).

(ii) Advisory costs of the NHS purchaser

Table 8.16 (overleaf) shows that the cost of advisory services for the NHS purchaser were quite stable over the first three periods, both in absolute terms (between £2.3 million in 2000-2002 and £2.89 million in 2003-2005) and as a proportion of capital value (at 3.4% in 2003-2005 to 3.9% in 1997-1999). However, this stability breaks down in the final period, at which point there is a marked increase in the absolute cost of advisors (at £8.5 million, along with a marked reduction in this as a percentage of capital value, 2.08%). This is likely to reflect the fact that the average capital value of schemes which signed in the final period was 81 percentage points higher than the previous period, and that advisory costs are affected by economies of scale (HM Treasury 2003a).

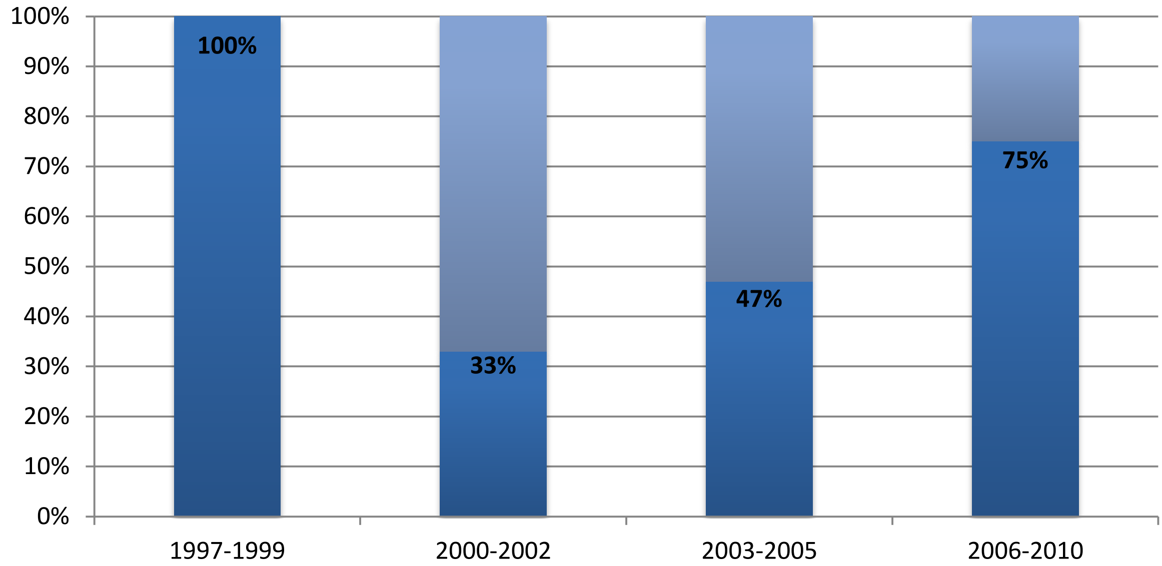
Table 8.16 Public sector advisory costs, and advisory costs as percentage of project capital value		
Period	Average public authority advisory costs (£m)	Advisory public authority costs as % of project capital value
1997-1999 (n=7)[i]	2.66	3.88%
2000-2002 (n=13)[ii]	2.3	3.83%
2003-2005 (n=18)[iii]	2.89	3.41%
2006-2010 (n=15)[iv]	8.55	2.08%
1997-2010 (n=56)	3.62	3.46%

[i] Carlisle Hospitals NHS Trust (1997); Dundee Healthcare NHS Trust (1999); Lanarkshire Acute Hospitals NHS Trust (1998a); Lanarkshire Acute Hospitals NHS Trust (1998b); Royal Infirmary of Edinburgh NHS Trust (1997); University Hospital of North Durham NHS Trust (1998); University Hospital of North Durham NHS Trust (1999)
[ii] Berkshire Healthcare NHS Trust (2001); Bro Morgannwg NHS Trust (2000); Cardiff and Vale NHS Trust (2000); Dudley Group of Hospitals NHS Trust (2001); Hull & East Yorkshire Hospitals NHS Trust (2000); Mid Devon Primary Care Trust (2002); Northumbria Healthcare (2000); Northumbria Healthcare (2001); Royston, Buntingford & Bishop's Stortford Primary Care Trust (2001); Sandwell & West Birmingham Hospitals (2002); University Hospital of North Durham NHS Trust (2002); West Middlesex University Hospitals NHS Trust (2001); Whittington Hospital NHS Trust (2002).
[iii] Brighton Health Care NHS Trust (2004); Cambridge University Hospital NHS Foundation Trust (2004); Central Manchester Healthcare/Manchester Childrens NHS Trusts (2004); East London and the City Mental Health NHS Trust (2004); Kingston Hospital NHS Trust (2004); Newham Healthcare NHS Trust (2004); NHS Argyll and Clyde (2004); NHS Greater Glasgow and Clyde (2005a); NHS Greater Glasgow and Clyde (2005b); NHS Tayside (2003); North Kirklees Primary Care Trust (2004); North West London Hospitals NHS Trust (2003); Oxford Radcliffe Hospitals NHS Trust (2003); Oxford Radcliffe Hospitals NHS Trust (2005); Portsmouth Hospitals NHS Trust (2005); Salisbury Health Care NHS Trust (2003); Sherwood Forest Hospitals NHS Trust (2005); Southern Derbyshire Acute Hospitals NHS Trust (2003).
[iv] Barts and the London NHS Trust (2006); Hull & East Yorkshire Hospitals NHS Trust (2006); Ipswich Hospital NHS Trust (2006); Mid-Yorkshire Hospitals NHS Trust (2007); NHS Fife (2007a); NHS Fife (2007b); NHS Forth Valley (2007a); NHS Forth Valley (2007b); NHS Greater Glasgow and Clyde (2006); Peterborough & Stamford Hospitals NHS Foundation Trust (2007); Salford Royal Hospitals NHS Trusts (2007); Sperrin Lakeland Health & Social Services Trust (2008); St Helen's and Knowsley Hospitals NHS Trust (2006); Tameside Hospital NHS Foundation Trust (2006); University Hospital Birmingham NHS Foundation Trust (2006).

Table 8.17 (overleaf) shows for all periods the mean number of bidders at each stage of competitive procurement (i.e. prior to the preferred bidder stage). Following this, Figure 8.2 shows the proportion of projects during each period that received two or fewer developed bids - defined, as noted above, as bids made in response to Final Invitations to Negotiate.

Table 8.17 Mean number of bidders per period at each stage of competitive procurement				
Period	**Prequalified Bidders**	**Prelim. Invitation to Negotiate**	**Final Invitation to Negotiate**	**Best and Final Offer**
1997-1999 (n=7)	6	2.67	1.83	1.67
2000-2002 (n=13)	7	6	3	2.33
2003-2005 (n=18)	5.94	3.81	2.74	2.11
2006-2010 (n=15)	2.73	2.3	2.2	2.2
1997-2010 (n=56)	*4.95*	*3.30*	*2.45*	*2.09*

Figure 8.2 Proportion of projects attracting two or fewer bids at FITN



The average of five pre-qualifying bidders appears healthy – although this number reduces sharply in the 2006-2010 period, to 2.73. There is substantial variation between projects at this stage. One project - NHS Greater Glasgow's £180 million Ambulatory Care Centre at Stobhill, had just one pre-qualifying bidder (so that the entire procurement took place on a single-bidder basis). A further six projects received only two bids at this stage, five of them in the period 2006-2010. In contrast, three projects had over 10 pre-qualifying bidders.

At the Preliminary Invitation to Negotiate stage, there is an apparently healthy number of bidders in the middle two periods, but this contrasts with weak competition in the first and final period. One-third of projects in the data set received two or fewer bids at this stage. The FITN stage follows a similar pattern (though with a lower amount of variation). As Figure 8.2 shows (above), in the 2000-2002 period there was a dramatic reduction in the proportion of projects receiving only two detailed bids, but this increased in the subsequent period and reached 75% by 2006-2010 (the period in which the Competitive Dialogue procedure was in place). The average number of Best and Final Offer bids was more stable, between 1.7 and 2.3. In total, there were six projects that received only one bid at this stage. The highest number of BAFO bidders was three, which applied to eight projects.

(iii) Changes at the preferred bidder stage

Table 8.18 (overleaf) details for a group of 15 projects that reached financial close between 2003 and 2006 the value of changes to output specification, the proportion of the unitary charge represented by this value, and changes to contract length during the preferred bidder stage. Changes in output specification that led to significant changes in the unitary charge were made to nine out of the 15 projects, and the length of the contract period was extended in eight out of 15. In six cases, changes were made to both output specification and contract length, indicating that purchasers are responding to pressures that their project had become unaffordable, due to increases to the scope or output specification, by increasing the length of the contract, and thereby reducing the rate of amortisation.

The scale of the changes to the unitary charge were in some cases substantial. At Queen Mary's Roehampton, the change in output specification consisted of the addition of a new mental health facility as part of the project. The value of the change was equivalent to 71.5% of the unitary charge at the onset of the preferred bidder process. According to the Full Business Case for the project, this increased the Net Present Cost of the project, calculated on the basis of a real discount rate of 3.5%, from £350 million to £650 million. In one case – Portsmouth Hospitals NHS Trust's £236 million scheme – a total of five years were added on to the contract period (from 30 to 35 years). Only on three of the schemes were there no substantial changes in output specification or contract period extensions. The average value of changes in output specification as a proportion of unitary charge at preferred bidder was 11.66% and the average increase in the contract length was 1.5 years.

Table 8.18 Value of changes to output specification, proportion of the unitary charge represented by this value, and changes to contract length during the preferred bidder stage of negotiations				
Project	Financial close	Change in annual unitary charge due to change in output specification (£m)	Value of change as proportion of unitary charge at preferred bidder (%)	Increase in contract length (yrs)
Sherwood Forest Hospitals NHS Trust	01-05-03	0	0	2
Queen Mary's Roehampton	01-05-04	3.85	71.51	0
Buckinghamshire - Stoke Mandeville	01-05-04	1.2	14.46	2
Brighton Health Care NHS Trust	10-06-04	0	0	0
Lewisham Hospital NHS Trust	08-07-04	5.04	18.15	1.5
Cambridge University - Addenbrookes	27-10-04	0.63	8.94	0
Leeds Teaching Hospitals - St James	15-10-04	2	9.05	0
Newcastle Upon Tyne Hospitals NHS Trust	27-04-05	0	0	3
Northgate/Prudhoe - Neuro Disability	21-07-05	0.15	Data missing	2
Oxford Radcliffe Hospitals - Churchill	13-12-05	0.026	0.17	0
Portsmouth Hospitals NHS Trust	15-12-05	1.2	3.60	5
Hull & East Yorkshire Hospitals NHS Trust	26-02-06	0	0	0
Ipswich Hospital	28-03-06	0	0	0
St Barts & The Royal London	20-04-06	31.5	29.17	2
University Hospital Birmingham	14-06-06	4.82	8.28	5
AVERAGE		**3.36**	**11.66**	**1.5**
Source: National Audit Office (2010b)				

(iv) Summary of results for the procurement process

In this section, barriers to market entry were examined with respect to procurement periods and the costs of advice for NHS purchasers. On average, procurement has taken approximately 40 months, and there is no consistent trend of reduction over time. For most projects, the preferred bidder stage – a stage which is associated with rapid escalation in advisory and development costs - accounted for the majority of this period. On average, the preferred bidder process accounted for 21.4 months, and the competitive phase some 18.2 months. The average for projects signing in the years 2008, 2009 and 2010 provided an exception to this, with an average competitive phase of 22 months, and preferred bidder phase of 12 months. The average cost of advice for NHS purchasers increased over the periods, from £2.66 million to £8.55 million (and was £3.62 million overall), but reduced as a percentage of capital value, from 3.9% of capital value in 1997-1999 to 2.1% in 2006-2010.

The number of bidders reduces significantly as the procurement process advances. By the FITN stage, at which point bidders submit detailed bids, the average number of bidders is 2.45. In 1997-1999, all projects received two or fewer bids at this stage of procurement. In the subsequent period, this proportion fell to 33%, but in the most recent two periods, the proportion increased, to 47% in 2003-2005 and 75% in 2006-2010. The low number of bidders in the final period may reflect the fact that the Competitive Dialogue procedure, which curtails the scope of negotiations after the appointment of preferred bidder, requires more detailed (and thus more costly) negotiation prior to the FITN. Across the four periods, the mean number of Best and Final Offer bids was just over 2, suggesting relatively constrained competition on average in the final phase of pre-preferred bidder procurement.

The preferred bidder stage is associated with major changes in the scope and length of contracts. The average value of changes in project output specification as a proportion of unitary charge at preferred bidder was 11.66% and the average increase in the contract length was 1.5 years. These results show that major changes to contract specification have taken place (and have been priced) during a period in which competitive tension is absent.

8.4 Interpretation of results

This chapter has examined the structure and competitiveness of the market for private finance in NHS PFI, focusing on three elements: market concentration, entry/exit and the procurement process. Descriptive statistics for the degree of concentration in the markets for blended equity and senior debt have been evaluated, along with indicators of market dynamics, specifically churn and market penetration rates. As market share is allocated to firms through procurement competitions, the degree to which competitiveness has been achieved has been analysed through an evaluation of barriers to entry, the number of bidders, and the scope of monopoly bargaining during the exclusive preferred bidder phase.

It is evident that the equity and debt markets are oligopolies with at least a *moderately high* level of concentration when assessed using regulatory norms. It is also clear that the markets trended towards higher concentration up to the point of the financial crisis. As noted above, for the OFT, a CR_5 in excess of 40% is a “reasonable indication” of competition problems in government procurement markets - and therefore grounds for further regulatory investigation (*econ* 2004). In addition, the prediction of competition problems arising from this is regarded as stronger where CR_5 is stable or increases over time (p. 179).

Certain features of the PFI market may be responsible for this. Where repeated selection of the same few firms increases incumbency advantages (e.g. through learning-by-doing, or as a result of being able to secure cheaper finance through demonstrating success), a buyer awarding a contract to the cheapest supplier in a series of tenders may find itself with a restricted choice of suppliers in the long term (*econ* 2004). To the extent that bidders anticipate such an outcome, they have an incentive to reduce their price when a new programme is first put out to tender in the expectation of little competition and higher profits in the future. Where the public sector is focused on short-term value for money gains, or is buying in a context where financial considerations are prominent, a reduction in competition over time may occur. This may affect NHS purchasers in relation to the specific procurement, but also in future procurements for NHS organisations in general, as the gap between market leaders and smaller firms widens, resulting in greater concentration. If incumbents are in a privileged position when it comes to new tenders, this may discourage participation of firms with low chances of winning, and may weaken competition overall.

Where markets are concentrated, the public sector may fail to exercise countervailing buyer power against suppliers if its demand is *fragmented*. Although the NHS accounts for a significant proportion of demand within the industries involved in PFI (namely construction, business services and project finance), this demand is split across individual NHS organisations, acting in an un-coordinated way. For example, Peter Coates, Commercial Director at the Department of Health, stated in oral evidence in the House of Commons that "controlling the market was quite difficult for us, particularly as trusts were very interested in controlling their own destiny" (Public Accounts Committee 2010, p. 84). The fragmented nature of the demand is a particular source of concern where central government dictates the form of financing to be used, eliminating the potential for alternative procurements (see Chapter 2). As *econ* (2004) notes, alternative procurement options can provide a significant constraint on the exercise of markets by bidders engaged in government procurements.

However, while oligopolistic, both the equity and senior debt markets are relatively dynamic in terms of entry, exit and turnover. For equity, the average turnover rate was 83% and for senior debt 75%, indicating a market in which equity providers are able to enter and exit the market with relative freedom. However, both markets exhibit very low levels of *net* entry, or churn. Despite the significant increase in the size of the market (in capital value terms) over the 14 year period, churn rates are very low, or negative, with the average rate for equity at - 0.06% and for senior debt just 0.06%. It is evident that the firms in the market were providing larger and larger amounts of capital per project over the 14 year period. For example, in 1997-1999, an equity provider needed to invest in projects with a combined capital value of £62.2 million to be part of the top eight firms. By 2006-10, this had become £209.5 million. In terms of the equity market, there is a limited number of firms with the balance sheets to provide this level of capital investment (Carrillo *et al* 2006) - a constraint that may help to explain the increase in market concentration in the equity market over the 14 years. Along with the impact of procurement costs (see below), this may also account for the very low rate of market penetration in equity, compared with that in the debt market.

Oligopoly theory dictates that, for the constraints of the procurement process to have a long-term effect on market structure, it is necessary that the threat of potential competition from new entrants is not effective. For example, if entry barriers are low or absent, then the effect of unsuccessful bidders being forced to leave the market (after losing a number of public tenders) would be limited: the threat of potential competition from new entrants would persist and would be sufficient to constrain the market power of firms in the market (*econ* 2004). In contrast, where there are significant barriers to entry, the procurement process will affect market structure as contracts are awarded to a limited number of firms.

Where a concentration in market share leads to a reduction in the competition for contracts, this may confer substantial advantages on market players when bargaining with purchasers. The final section of this chapter shows that transaction costs are a major barrier to market entry. On average, NHS purchasers' advisory costs were £2.66 million in 1997-1999 but this rose to £8.55 million in 2006-2010. It is here assumed, on the basis of empirical evidence provided by Dudkin and Välilä (2005) that these costs would be to a large extent mirrored by the winning bidder (to say nothing of losing bidders, whose costs, according to Dudkin and Välilä, are in the range of 5% of a project's capital value). If so, this clearly represents a major barrier to entry. Analysis of procurement periods assists in explaining why transaction costs are high. On average, procurements take in the region of 40 months, and for most projects, the majority of this period has been taken up by the preferred bidder stage – a stage associated with rapid escalation in advisory costs owing to the need to secure external financing and negotiate the final shape of the contract.

As the average capital value of projects has increased, the average number of bidders in the final stages of competitive procurement has decreased, and the proportion of projects that are advanced on the basis of just one or two bids has increased since 2000-2002. The mean number of final bids was just over 2 (despite NHS Executive guidance (2002) which mandates that a minimum of three bidders should be in place in the final stages of the competition), and there were several "single bidder" procurements, undermining the power of *ex ante* competition - which in the PFI context is the only possible form of competition. The increase in the number of duopoly competitions at FITN and BAFO may reflect the fact that, under the post-2005 Competitive Dialogue procedure, there is a need to reach a greater level of agreement with bidders prior to the selection of a preferred bidder, after which the scope of negotiation should in theory be much more circumscribed. Although there is flexibility within Competitive Dialogue for bidders and the authority to discuss how the output specification will be met, once the competitive phase has closed, in principle bidders can only be requested to fine tune, specify and clarify their bids. As noted in chapter 3, this reflects a concern by the European Commission that the preferred bidder stage may distort the outcome of the competition. The impact this has had on the competitive phase of procurement may be regarded as an undesirable feature of Competitive Dialogue, since it weakens the degree of competitive tension at this stage, increasing the chances of collusion in pricing, and leaves purchasers vulnerable should a bidder subsequently withdraw. In any case, the data presented above suggests that the preferred bidder stage, while much shorter than under previous arrangements, remains extensive under Competitive Dialogue.

8.5 Conclusion

This chapter has shown that the markets for PFI equity and debt capital are concentrated and that the procurement process provides limited scope to mitigate the market power of large providers. Indeed, it is evident that the structure of the market is heavily influenced by the procurement process, which is characterised by high transaction costs (and therefore barriers to entry), a low number of bidders and an extensive period of exclusive negotiation in which material changes are made to the scope and price of bids. In this context, economic theory would predict that rates of return to investors would contain a premium above that required to remunerate firms for the risk that they bear. It is therefore reasonable to conclude that the excess returns identified in the previous chapter have their origins in the concentrated market structure and limited competitiveness of the market outlined above.

9. Conclusion

9.1 The main findings of this thesis

This thesis demonstrates that (a) the returns to equity and debt investors on a group of PFI schemes are higher than we would expect to find given the risks being borne; and (b) the institutions through which returns are determined fail to mitigate the potential for market power to be acquired and exercised. The analysis in Chapter 7 drew on the financial models of 11 NHS PFI projects to describe and evaluate the projected return to investors. Substantial differentials between IRRs and cost of capital benchmarks were recorded, in addition to high Benefit-Cost Ratios. On the basis of the assumptions made, and mindful of the limitations of the research in terms of the methods adopted and the frameworks used, the thesis identifies the presence of significant excess returns in relation to the 11 projects.

The scale of this excess profitability is indicative of imperfect competition within the markets for equity and debt, and this is supported by the analysis of market structure. Chapter 8 demonstrates that the markets for PFI equity and debt capital are concentrated when assessed against regulatory principles and that the procurement process is extensive, costly, and ultimately monopolistic. While these markets are dynamic in terms of market entry and exit, levels of net entry are low, and new providers have in most cases been unable to capture significant market shares. Consistent with this, these markets have trended towards higher concentration over time, as demand for new projects has increased.

The presence of excess returns to investors reduces the cost efficiency of the PFI method and of the health care organisations that bear the ongoing cost of contracts. Excess costs damage the economic and fiscal sustainability of the NHS by exerting a greater than necessary burden on revenue and limiting the opportunities for additional investment that could enhance the cost efficiency of the system. The rest of this concluding chapter explores the implications of this for the NHS and other health systems. The durability of excess returns in PFI markets is explored, and the case is made for further government intervention to ensure that returns on future contracts are brought down to a more cost efficient level.

9.2 Excess returns, efficiency and health system sustainability

As noted in Chapter 1 of this thesis, improved cost efficiency in a health system's capital expenditures can enable resources to be re-allocated from fixed costs to other expenditures in the health system, and also generate savings that can be used for additional capital requirements. However, the opposite is also true. Where financing processes are inefficient, financial resources must move from the provision of clinical care to capital spending, and the amount of additional investment that can take place in the health system is curtailed.

Had financing for the 11 projects examined been available at the Weighted Average Cost of Capital rather than the Project IRR, the unitary charges on each of the 11 projects would now be considerably lower. This is an extremely important issue since, as is discussed in Chapters 1, 2 and 5, the costs faced by NHS organisations with operational PFI schemes have been shown by empirical research to be a major call on their budgetary resources. In some cases, this can undermine the capacity of NHS organisations to achieve financial balance and/ or meet population health care need (Gaffney *et al* 1999; Shaoul *et al* 2008; PricewaterhouseCoopers 2005; Hellowell and Pollock 2009a; 2009b; Hellowell 2011b).

This implications of carrying an excess cost of capital are particularly concerning in the context of market-oriented reforms, as envisaged in the coalition government's Health and Social Care Act. Under the reforms, outlined in Chapter 1, there will be a fuller market in hospital care – subject to European Union competition law and regulated by Monitor, an economic regulator. Patients will be able to choose any willing secondary care provider, so long as that provider is able to meet NHS standards and to undertake treatments for a nationally-agreed price, set according to average NHS costs. The use of fixed prices is designed to encourage the entry of private hospital providers that are able to provide treatment at below this average cost into the provision of hospital care (Cooper *et al* 2010).

Given the fixed price regime, new independent sector entrants will be facilitated in competing against existing NHS providers if the latter group are either inefficient *or* are not properly reimbursed for their costs - such as those with an excess cost of capital. In a recent analysis of the extent to which the competition between NHS and independent sector providers will be on the basis of a 'level playing field', Sussex (2009) suggests that differences in the cost of capital between these sectors will be a major source of unfairness.

> "Where NHS Trusts and NHS Foundation Trusts are required to seek PFI finance for their investment, which is the default for most large investment projects such as building and running major new hospital facilities, they are effectively borrowing from the same capital markets as IS [Independent Sector] providers. Thus *for a given project in these circumstances the cost of capital should be the same for each type of provider*" [my emphasis] (p.15).

Sussex suggests that the difference in the cost of capital for a private sector provider versus an NHS or Foundation Trust that is able to borrow from the national exchequer (at an estimated 3.5% in real terms) would be between 0% and 1%. However, if the structure or competitiveness in the market for PFI contracts leads to an excess cost of capital, there is no guarantee that private finance will be available to NHS Trusts at the same rate as that available to private operators. Indeed, the findings of this thesis indicate that the cost to NHS or Foundation Trusts with large operational PFI contracts would be between 3% and 5% higher than the estimated real exchequer rate, partly as a result of excess returns, suggesting that PFIs will be a major source of competitive disadvantage for Trusts against other NHS organisations and private sector providers.

A second way to view excess returns is in terms of foregone opportunities for investment. The use of Benefit Cost Ratios in the assessment of Free Cash Flow to the Project is useful in this regard. The Benefit Cost Ratio measure implies that, had a project been funded with the rate of return set equal to the discount rate (i.e. the Weighted Average Cost of Capital), then for the same present value as the stream of cash-flows the related NHS organisation could have secured the amount of capital which was actually raised multiplied by the Benefit Cost Ratio. For example, the Benefit Cost Ratio on the NHS Lothian – Edinburgh project was 1.69 (based on a Weighted Average Cost of Capital of 6.8% – i.e. as calculated on the basis of the higher equity risk premium and the base case cost of senior debt). This implies that this project is carrying an excess cost of capital equal to 69% of the cost of providing the hospital. In turn, this suggests that NHS Lothian (or the broader NHS) could have secured 69% more capital investment than was raised for project had finance been available at an interest rate of 6.77%. To the extent that capital investment is likely to increase the efficiency of the health system (and given the inappropriate profile of the current NHS estate, as outlined in Chapter 1, this appears to be a reasonable assumption), then the lost opportunities for additional investment has a negative impact on financial sustainability.

However, the presence of the excess return is not, in and of itself, conclusive in terms of the relative cost efficiency credentials of private finance versus public finance for capital investment in health systems. It is evident that even where returns on investor capital are in excess of the level determined by the degree of risk involved, there remains the possibility that the PFI capital structure delivers efficiencies in project delivery that are sufficient to offset the extra financial cost (including both the 'legitimate' risk premium, and the excess premium), such that the model offers good value for money overall. In principle, the inclusion of the "F" in the DBFO structure may strengthen the incentive to provide the DBO components with such efficiency that the Net Present Cost to the NHS commissioner is lower than for an equivalent set of services delivered under conventional procurement.

The findings of the literature review in Chapter 5 show this is not the case, however. The balance of the evidence suggests that the outturn cost of design-and-build is slightly higher in PFI schemes when compared to those of conventionally procured capital projects; and that the quality will be similar or somewhat lower. Turning to the post-construction components, evidence from the National Audit Office on the past performance of PFI hospitals (2010a) found that maintenance costs in PFI hospitals were higher than in non-PFI hospitals and that service costs "are broadly the same between PFI and non-PFI hospitals for all services" (p.23). Turning to the issues of quality in services, auditors found: "that PFI hospitals are not performing significantly better or worse than other hospitals" (p.17).

There is, in summary, no evidence as yet that there are cost savings or quality improvements in the operational components of the PFI capital structure that might offset the higher cost of private finance. Since this is the case, it is apparent that the excess cost of finance identified in this thesis is a further element of inefficiency from the point of view of the purchaser, and this undermines the sustainability of the health system more generally.

Recent budget restrictions mean that in each of the four jurisdictions, NHS budgets are to remain, in real terms, roughly at their current levels until the middle of the decade (HM Treasury 2010c; Scottish Government 2011; Welsh Assembly Government 2011; Northern Ireland Executive 2011). Over the same period, according to estimates by the London-based think tank the King's Fund (2011), demographic changes will increase the annual costs of the health system by 1.1% in real terms, meaning that the NHS will be subject to increasing financial pressure. There is a clear risk that NHS organisations will seek to restrict the depth of health care coverage in response to such pressures. Indeed, increasing waiting times (in effect, a form of rationing) were, at the time of writing, being reported (King's Fund 2011). Ensuring that capital financing methods are cost-efficient is a key task of health system policy-makers, but this is especially crucial in a period of severe budgetary consolidation.

9.3 Implications for global health systems and population health

From a global health perspective, the internationalisation of PFI increases the importance of examining whether, or the extent to which, the model is associated with excess returns to private investors. In the UK, like much of the high-income world, the ongoing costs of capital investment are borne by the government (since revenue resources are generated via government-organised and pooled pre-payment mechanisms and care is provided free at the point of use) and this helps to insulate individuals from needing to pay for health care, including the direct costs of any excessive return to private investors. However, pre-payment and pooling are not the norm in many low- and middle-income countries where the costs of care are generated via direct user payments and pooling systems are generally fragmented (World Health Organization 2010). Therefore, in much of the developing world, excess returns may increase the cost burden placed directly on individuals seeking needed care, and/or place the sustainability of the fragmented risk pools under additional pressure.

In turn, this has implications for the UK government's export policies. As outlined in Chapter 1, the UK government has alongside PFI industry representatives been involved in the promotion of the PFI model to governments of both developed and developing countries. As a recent industry submission to the Treasury Select Committee inquiry from the PPP Forum, the main representative group for the PFI industry, notes: "The PFI has proven a valuable export commodity for the UK economy" (Treasury Select Committee 2011). In his examination of the role played by the previous Labour government in exporting the PFI model to developing countries, Holden (2008) suggests that the use of PFI as a key part of trade policy is likely to be unacceptable for both equity and efficiency reasons. He adds:

> "Given the resource constraints in developing countries, even more so than in other countries, efficiency and equity goals are paramount [in health systems]. This means that policy should attempt to bring about the greatest possible health gain with the resources available, but do so as far as is possible in an equitable manner. Ensuring access to suitable services for the poor becomes a particular challenge in such countries. It is doubtful that [PFI] provides the most effective means of meeting these goals, given its unproven efficiency and its long-term inflexibility" (p. 327).

Despite concern among scholars, the process of exporting the PFI model is continuing under the current coalition government. Lord Sassoon, the Commercial Secretary to the Treasury, told an industry conference in December 2011 that: “The coalition is committed to promoting PFI expertise internationally” (Commercial Secretary to the Treasury 2011).

These export tasks are undertaken by UK Trade and Investment (UKTI), a government agency. Current projects of the UKTI include delegations to South Africa (where the UKTI states that £18 billion of PFI projects are planned by the Department of Health); Romania (where six emergency hospitals are due to be built under PFI); the Philippines (in which PFI will be used to develop 25 new regional hospitals) and Chile (where six new hospitals are being procured under a PFI programme over the three years from 2010) (UKTI 2011).

An example of the operation of PFI in the health system of a small low-income country helps to illustrate some of the issues presented above. In December 2007, a PFI contract involving the design, build, financing and operation of a new 425-bed national referral hospital in Lesotho, was finalised (World Bank 2008). The capital investment value of the scheme was US$107 million in 2007 prices - approximately three times the capital budget of the Ministry of Health in that year (Smith 2009). The selected consortium includes Netcare, a major South African health care provider, which will provide clinical services under the deal in addition to managing other services. The project was financed by the Bank of South Africa along with a group of local banks, and the transaction was managed by the International Finance Corporation, the specialist financing arm of the World Bank. The revenues used to provide a return for investors and fees for clinical services are funded by direct contributions from the Lesotho government (equal to 40% of the Ministry of Health budget) combined with increased charges to users for the delivery of health care (Smith 2009).

While it is not known what proportion of the 40% relates to the remuneration of private investors involved in the project, it is evident that any level of excess return could have serious consequences for the sustainability of the state-funded component of the health system in Lesotho. In addition, where revenue is raised from user charges, and these charges are in part calibrated to provide investors with an excess return, this may erode equity of access to health care and exacerbate the financial consequences of ill-health.[103]

9.4 The sustainability of excess returns on equity and debt

Once it has been established that excess returns are being earned on equity and debt capital in PFI projects, it is important to consider whether such excess returns are likely to be permanent features of the market, or whether they are likely to be eliminated over time.

(i) Equity

It has been suggested that, with low-risk models such as the availability-based revenue structure of PFI hospitals, increasing competition will lead to a “commoditisation effect” in equity provision, and a lowering of targeted returns (John Laing plc 2005). However, this

[103] It is widely acknowledged that direct payments can have serious repercussions for individual health as they discourage the use of preventative services, and encourage the postponement of important health checks at an early stage when the prospects for a cure are greatest (World Health Organization 2010). The World Bank states that a high proportion of the world’s 1.3 billion poor have no access to health care for the simple reason that they cannot afford to pay for health services at the time that treatment is required (Preker *et al* 2004). In addition, direct payments for health care are associated with financial impoverishment in many low-income countries. Direct payments are known to have pushed approximately 100,000 households in both Kenya and Senegal, and about 290,000 households in South Africa, below the poverty line in just one year (ILO 2008).

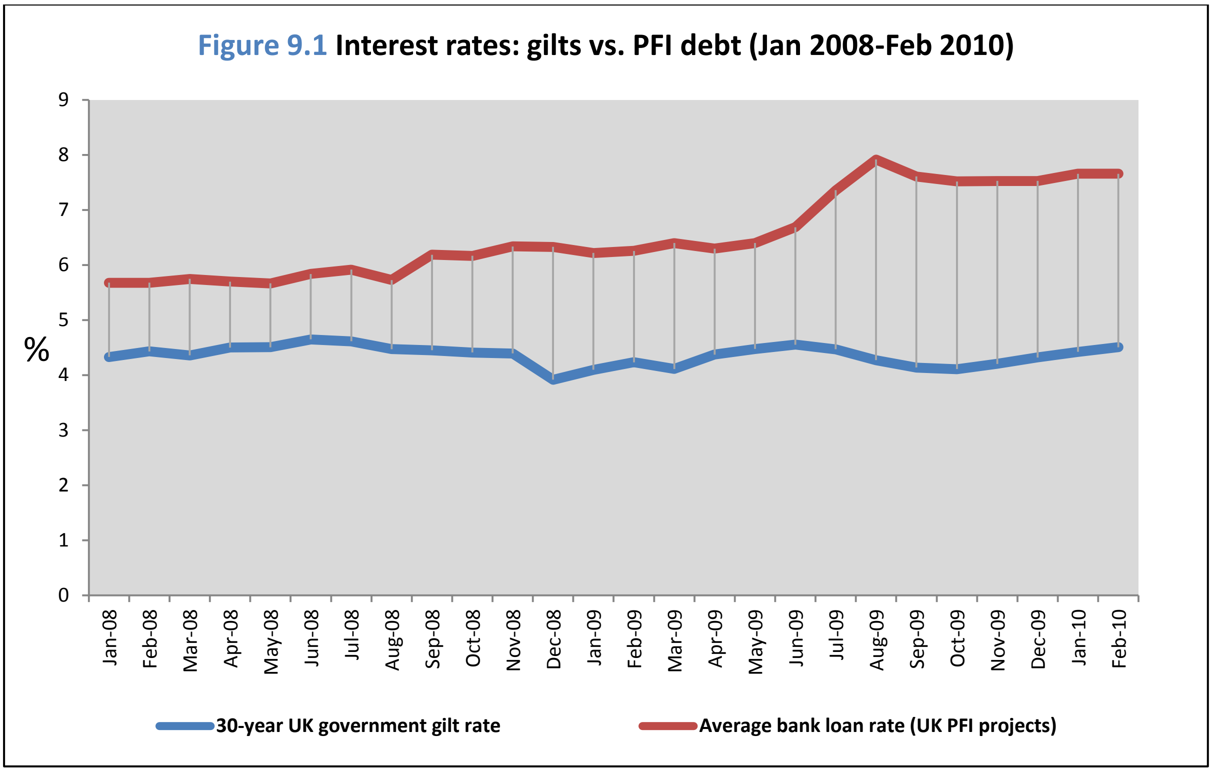
thesis presents evidence to the contrary in Chapter 7. Indeed, while health system purchasing remains fragmented and procurement processes remain defective, it seems reasonable to conclude that: (i) barriers to entry, (ii) the inherent complexity of this form of investment and (iii) the need for an extensive and exclusive final stage of negotiations, will continue to enable excess profits to be extracted from NHS organisations. Set against the broader context of growing demand for private finance in an internationalising market (i.e. one in which governments are increasingly competing for willing investors, rather than the other way round), and the expansion of private financing in alternative sectors (for instance, renewable energy and high speed rail), there is no compelling reason to expect a general reduction in the returns being targeted by investors in the PFI market for equity finance.

(ii) Senior Debt

Meanwhile, it is evident that the dislocation in global financial markets has led to a significant increase in the cost of senior debt finance when compared to the interest rates reflected in the Project IRRs of the projects evaluated in Chapter 7 of this thesis. Commercial bond finance - hitherto the cheapest form of senior debt for PFI projects – has been unavailable since mid-2008, when many of the large US 'monoline' insurers such as Ambac and MBIA lost their "triple-A" credit rating in the midst of the "subprime" mortgage crisis (Hellowell 2010). These institutions played a key role in providing senior debt for large projects by guaranteeing repayments to bondholders in return for a fee and reducing overall financing costs. The withdrawal of the monolines' ability to provide a guarantee has removed commercial bond financing as a relatively low-cost option for the medium term.

At the same time, banking sector liquidity has reduced dramatically since the crisis of 2007-09. Changes in banking regulations, including Basel III (Bank for International Settlements 2011), Solvency II (European Parliament and the Council of the European Union 2009) and the final report of the government-commissioned Vickers Report (Independent Commission on Banking 2011) and concerns about the quality of assets held by large commercial banks in the UK and the eurozone have led to restrictions in lending (HM Treasury 2011f). As a result, there has been a strong trend away from the "lead arranger" model in which a bank manages a transaction, underwrites the debt and syndicates part of it to other banks to reduce their exposure to project risk (KPMG 2009). Many banks now refuse to accept syndicated debt due to a widespread breakdown of confidence between institutions. Consequently, there is a trend towards 'club' deals, in which groups of banks finance the deal collectively, spreading the debt between them (typically in packages of between £25 million to £50 million each). For example, on the £187 million Kirkaldy hospital project, a club of four institutions (Helaba, Lloyds Banking Group, NAB and SMBC) was established, each contributing £42.5 million to the debt requirement (Treasury Select Committee 2011). The involvement of a large number of lead banks for each PFI project involves considerable investment in due diligence costs (which are ultimately borne by the public sector in the form of higher annual charges) and, perhaps more importantly, results in a significant erosion of competition in the PFI debt market and an increase in rates of return on debt.

This is borne out by empirical research. According to the National Audit Office (2010c), average PFI credit margins on availability-based projects have risen from an average of around 0.75% before the financial crisis to between 2.5% to 3% in 2010. This increase in the cost of finance has occurred despite the fact that, as noted by the consultancy KPMG, "the credit quality of PFI projects is as strong as ever and arguably more so given the credit enhancements we are seeing on recent deals" (2009, p.4). As noted in Chapter 4, the credit margin on an investment is theoretically determined by a project's level of credit default risk. It is possible that, contrary to KPMG's claim, lenders regard the level of risk as somewhat higher in the current economic environment. For example, the risk of contractor liquidation may be regarded as higher in conditions of serious economic downturn, and this is one of the scenarios highlighted by Standard & Poor's (2006) as increasing default risk. However, the scale of the increase in margins over the period since September 2008 indicates that the rate of return on debt being provided contains a substantial premium that is unrelated to the level of default risk, and is associated with credit constraints and an uncompetitive market. In other words, authorities that enter into PFI contracts now will pay a higher price than they would have before the financial crisis, despite the historically low cost of gilts financing. The resulting increase in the "spread" between the rate of return on long-term government gilts and that levied on senior debt loans issued to PFI projects, which can be seen in Figure 9.1 below, is indicative of lower cost efficiency for authorities.



Source: Debt Management Office (2010); Thomson Financial (2011)

Following a critical report from the Treasury Select Committee (2011)[104], the UK government has acknowledged that the rising cost and reduced availability of senior debt require a policy response. In December 2011, the Treasury published a call for evidence from interested parties on options for reforming the PFI model. This document states:

> "…as financing markets change and develop in response to changing financial regulation and a changing global economy, we must ensure that if private finance is used to deliver public sector assets and services, we access wider financing sources; and that the costs of private finance are more than offset by the wider benefits of private sector delivery" (HM Treasury 2011f, p.3).

[104] The author was the special adviser to the committee on this inquiry, and, along with Daniel Fairhead of the National Audit Office and the approval of the MPs that sit on the committee, drafted the final report.

The intention of the current review is to reduce reliance on commercial banks by accessing "a wider range of financing sources, including encouraging a stronger role to be played by pension fund investment" and generating "a better balance between risk and reward to the private sector" (HM Treasury 2011f, p.4). What the outcome of this review will be cannot be determined at the time of writing. However, the Treasury has stated that it wishes to "maintain the incentive on the private sector to deliver capital projects to time and to budget and to take performance risk on the delivery of services" (p. 4) indicating that many of the core contractual components of the PFI model are likely to remain in place and that there is still a desire to retain the advantage of the PFI model in terms of national accounting and statistical assessments of fiscal debt and deficit (as explained in Chapter 3) will be maintained. However, in order to access the capital of pension funds, for whom the capacity to take risk is limited by government regulation, a shift in the allocation of risk from private to public sector is likely to be required, and this will require careful structuring to maintain off-balance sheet status under the European System of Accounts (EPEC 2011b).

Related developments are also taking place at the level of the European Union. As noted in Chapter 2, in a speech to the Confederation of British Industry in May 2003, the then Chancellor of the Exchequer Gordon Brown announced that the UK government would use its influence to expand PFI in the EU as part of a broader push to liberalise European capital markets (Brown 2003). Since then, a number of PFI/PPP policy and promotional organisations have been created at EU level, of which the European Public-Private-Partnerships Expertise Centre (EPEC) is probably the most significant, being an attempt to create an EU-level agency tasked with the co-ordination and promotion of PFI/PPP across

Member States (Hellowell 2010).[105] EPEC is financially supported by the European Commission (DG Regio and DG MOVE) and the European Investment Bank (EIB) (EPEC 2011a). As shown in Chapter 8, the latter institution has the largest market share of any debt provider in the UK PFI hospital sector. The EIB is an increasingly influential voice in infrastructure policy-making at the EU level (Robinson 2009), not least because its capital has been in greater demand since the onset of the financial crisis (Ball and Chen 2010).

In November 2009, the European Commission published a communiqué on PFI/PPP outlining its intention to promote and facilitate the model's adoption by EU Member States.

The communiqué states:

> "To release fully the potential of public-private partnerships...the Commission intends to build an effective and enabling co-operation framework between public and private sector. Drawing on a dialogue with all relevant stakeholders through a dedicated PPP group to be set up by the Commission, a series of actions will complement Member States' actions to remedy the obstacles to the development of PPPs and to promote their use. These actions will focus, on the one hand, on the EU's instruments and regulatory framework, and on the other hand, on enhanced measures to improve access to financing of PPP initiatives while increasing the European Investment Bank's role" (p.12).

In line with this new role, the Commission launched in February 2011 a consultation on the 'Europe 2020 Project Bond Initiative', which will provide EU support to project companies

[105] For example, in October 2011, EPEC published guidance on how future PPPs undertaken by Member States can be structured so as to secure off-balance sheet status for national accounting (i.e. calculating government debt and deficit) purposes (EPEC 2011b). Given the political and economic priority currently accorded to deficit reduction in the eurozone (and the EU generally) this is an important contribution to the promotion of PPPs.

issuing bonds to finance large-scale infrastructure projects. Specifically, the Commission will share risk with the EIB to guarantee a rate of return to investors on project bonds (European Commission 2011), and use the capital secured to invest as subordinated debt (i.e. debt that absorbs the adverse financial consequences of project delays or other problems, thereby shielding holders of *senior* debt from such problems). According to a legislative proposal adopted by the Commission in October 2011, the Project Bond Initiative has two objectives:

> "… to revive project bond markets and to help the promoters of individual infrastructure projects to attract long-term private sector debt financing. The Project Bond Initiative would set up a means to reduce the risk for third party investors seeking long-term investment opportunities. It will thus act as a catalyst to re-open the debt capital market (currently largely unexploited for infrastructure investments following the financial crisis) as a significant source of financing in the infrastructure sector" (European Commission 2011).

In essence, what is happening is that the EU is providing a subsidy (in the form of low-cost risk capital), intended to address the market failure that has emerged since the collapse of the monolines (as described above). If pension funds and other investors are able to re-enter the PFI market, this is likely to increase the availability of private capital and lower the interest rates on senior debt relative to the rates currently charged by commercial banks. This development is at an early stage and the implications for the returns on senior debt cannot yet be conclusively assessed. Ultimately, however, it is likely to further stimulate the use of PFI and similar models in both the UK and elsewhere among the EU Member States.

9.5 Strategies for reducing the excess return to PFI investors

9.51 Competition for the market – the procurement process

The thesis has concluded that significant excess returns to investors on the PFI programme are associated with a lack of competitive pressure in the market for contracts. As the procurement process has failed to moderate the market power of the major providers, and has in fact contributed to its structural constraints, reforming the process is a natural place to look in considering methods for addressing excess investor returns. Extensive reform of the procurement process has already occurred in the shape of the Competitive Dialogue procedure discussed in Chapters 3 and 8, under which there is a need to reach a greater level of agreement with bidders prior to the selection of preferred bidder, after which the scope of negotiation ought in principle to be limited. However, the impact of Competitive Dialogue has been to increase significantly the barriers to entry into the competitive phase of the procurement process, reducing the degree of competition in bidding and increasing the chance of collusion in pricing. At the same time, the evidence presented in this thesis shows that the preferred bidder phase remains extensive under Competitive Dialogue.

The government has itself recently acknowledged the need for "an accelerated and cheaper procurement process" for the PFI and has signalled a move away from Competitive Dialogue (HM Treasury 2011f. p. 113). However, if the removal of the requirement to negotiate many of the substantive issues of output specification and price during the competitive stage simply leads to these substantive negotiations taking place during the preferred bidder stage, this will merely undermine the degree of contestability in procurement identified in

Chapter 8 of this thesis. The inherent complexity of this form of investment and the need to secure external financing are likely to constitute major obstacles to the success of any reform efforts aimed at making the procurement process more competitive and efficient.

9.52 The need for regulation

At the time of writing, the Treasury was consulting with major PFI investors on plans to introduce a “code of practice” on reducing the costs of existing deals, and individual public authorities are being encouraged to work with investors to identify and where possible implement reductions in their charges (HM Treasury 2010b). There is a degree of political pressure for rates of return to investors to be included in such reductions. In March 2010, the financial consultancy McKinsey published the results of an investigation into NHS efficiency, commissioned by the Department of Health (McKinsey 2010). The report advised the department to renegotiate the prices of PFI contracts, and suggested that a reduction of 3% in the financing charges on 80% of the contracts might lead to annual savings of up to £200 million a year for the NHS in England. MPs and think tanks have since supported the call for a reduction in returns in the context of NHS budget constraints. One cross-party group of MPs has called for a “rebate” from investors of up to £500 million (Norman 2011).

In principle, where returns to blended equity or project cash flow are significantly in excess of the relevant costs of capital, as dictated by standard corporate finance methods, there may be scope to negotiate a reduction in the amount of free cash flow to be generated by projects, and therefore a reduction in the charges to be paid by the NHS. Pragmatically, however, it should be recognised that there is a limit to the savings that can be achieved on existing contracts. Any attempt to impose a “hair-cut” on investors – i.e. by reducing the return anticipated by investors at the time that contracts were signed[106] – is likely to be perceived by the investment community as a default, and this could have major implications for the credibility of government debt. For this reason, government efforts to make savings on existing deals are likely to focus on the operational elements of PFI portfolios – and, especially, a reduction in the quantity and quality of services to lower the costs of provision.

For future projects, it is important that the return is driven down to the fair level. However, the structural constraints within the markets for PFI debt and equity, and the inherently uncompetitive nature of the PFI procurement process suggests that a change in, or an expansion of, the *regulatory regime* may be required to drive investor returns down to the efficient level and thereby minimise the cost pressures generated by PFI contracts for public authorities. In sectors of the economy where competition is not plausible or not efficient (e.g. in network industries with significant economies of scale) government intervention in the form of economic regulation is widespread and the rationale for it in terms of correcting market failures widely accepted by economists and policy-makers (Besley and Ghatak 2003).

A common component of economic regulation is the regulation of the price a company can charge. Under many versions of price regulation, regulators set the price a utility can charge so as to enable investors in that utility to earn only a specified maximum rate of return

[106] Where the return to an investor is significantly higher than the level projected at the time of contract signature, there may be an opportunity for such gains to be shared. If equities are sold by “primary” to “secondary” investors after the risky construction period has been completed, this can give rise to a capital gain, the post-tax value of which will accrue entirely to the primary investor. Similarly, it is evident that maintenance expenditure has often been over-estimated by bidders at the point of contracts being signed (National Audit Office 2011), generating additional investor cash-flow. In such cases, the *ex post* return on private capital will be higher than that projected *ex ante,* and it is possible that the government could use its purchasing power to negotiate gain-sharing arrangements without eroding its credibility. There is a precedent for this. In 2002, the Office for Government Commerce and several major investors in the PFI programme signed a ‘code of practice’ which committed the latter to share gains made via refinancing their debt (which accelerates cash-flow and increases returns), even though contracts did not stipulate any such sharing.

(Helm 2009). The specified rate of return is set according to the regulator's assessment of the utility's Weighted Average Cost of Capital (with the cost of equity derived through the Capital Asset Pricing Model along with consideration of the company's effective cost of debt, taxation and gearing) (Helm 2009). It is evident from Chapter 7 of this thesis that a similar approach could be developed for special purpose vehicles undertaking PFI projects. Specifically, the application of the capital budgeting method developed in the thesis could be used to re-calibrate unitary charges on future projects so as to generate cash-flows sufficient to provide a "fair", rather than an excess, return to investors of equity and debt.

Interestingly, the government review of PFI being undertaken at the time of writing specifically asks respondents to consider the role of regulating the equity return (HM Treasury 2011f). It acknowledges that: "in other markets, approaches are taken to limiting or regulating the economically efficient level of return that can be made by investors in infrastructure networks and services" (p.8) and asks interested parties to comment on whether regulation, capping or sharing of returns above a particular level "would be more economically efficient" than market pricing (p. 9). Such measures also appear to have some support from prominent individuals within the PFI policy-making community. James Stewart, a former chief executive of both Partnerships UK and Infrastructure UK and the current head of Infrastructure Advisory Services at KPMG, has suggested that by regulating the cash-flows to blended equity the cost of capital on privately financed schemes could be reduced significantly (Stewart 2009). In a similar vein, Nick Prior, currently head of infrastructure at the financial consultancy group Deloitte (and a former head of private finance policy at the Ministry of Defence), has suggested that regulating the rate of return that PFI investors earn would reduce the level of political opposition to PFI (Prior 2009).

Similarly, Richard Abadie, a Partner at the consultancy PricewaterhouseCoopers and a former head of PFI policy at the Treasury, told a Partnerships UK conference in London on 15th October 2009: "If we are concerned about the cost of private finance, what are we doing to regulate it? A PFI contract does not regulate the cost of finance. My opinion is that, if the government is concerned about the cost of finance, it should try to regulate it" (City and Financial 2009). The identification of excess returns presented in this thesis provides empirical support for the implementation of such rate of return regulation, while the analytical approach outlined in Chapter 7 provides a clear basis for setting the fair return.

In addition, it is important to recognise that regulatory intervention may be required throughout the contract period, and not just at the point that contracts are signed and base case rates of return agreed. As noted by the Treasury Select Committee (2011), a private company in charge of services over a 30 year contract is likely to find opportunities to reduce costs in this period. Of the services included within the PFI structure, only support services such as catering and cleaning are benchmarked or market tested during the contract period (as described in Chapter 3 of this thesis). Under the current version of the Standardisation of PFI Contracts Guidance (HM Treasury 2009), there is no mechanism under which the gains from efficiencies in maintenance can be shared with the public sector. As a result, any gains accrue to equity-holders in their entirety and this may increase the rate of return on blended equity substantially beyond that rate agreed at financial close.

This is because these services are not value tested and contractors do not share with public authorities information on their maintenance spend (National Audit Office 2010a). This is undesirable in its own terms, but may also lead to opportunistic behaviour. Currently, because “soft” facilities management services are benchmarked/ market tested, there is an incentive for a bidder (working within the context of a strict public sector budget constraint) to under-price this element of the services at the point of financial close, while over-pricing the hard facilities management services (i.e. build in a margin above the market level). When in subsequent years the price of the soft facilities management services are benchmarked, this will lead to the price going up. The public sector will in this event pay a *current* market price for the soft services and an *above*-market price for the hard facilities management, and it will pay this inefficient price for the entirety of the contract period.[107]

One option would be to examine the potential for broadening the benchmarking/market testing process to include all services. However this is complex. For example, there would be a need to consider how the price paid for maintenance services interact with the costs of lifecycle replacement and in practice, this may not be possible. A simpler, and likely more effective, method would be to ensure that any free cash-flow to blended equity in excess of that required to provide equity investors with the rate of return projected at financial close is shared with the public sector. This would ensure both that the private sector retains an incentive to invest in productivity gains in maintenance (since they would have a partial claim to the resources this generated) but that the benefits from this are shared with the public sector. As the National Audit Office has noted, the Department of Health “does not use its leverage over the market from having such a large number of contracts in force” (2010a, p.8). Just as regulation could be used to address efficiency problems that arise from fragmented demand and concentrated supply for new PFI contracts, an attempt by the NHS to co-ordinate its management of existing contracts may assist in managing the ongoing

[107] With thanks to Peter Reekie, finance director of the Scottish Futures Trust, for this important insight.

costs of PFI, to ensure that excess returns are not being made at the expense of the NHS – a health system that, as noted above, is now coming under severe budgetary pressure.

9.6 Final word

As noted at the beginning of this thesis, there is a growing requirement for substantial investment in health care capital if the quality and sustainability of health systems are to be maintained. Given the importance of capital for health systems, there is considerable value in research that seeks to examine empirically the cost efficiency of financing methods. Efficiency in financing minimises the adverse impact of investments on current expenditure (enabling resources to be allocated away from capital budgets to revenue) and maximises the resources available for efficiency-promoting capital projects. Inefficiency in financing means resources must move from the provision of clinical services to capital costs, and the potential for investment is constrained. Cost efficiency is especially crucial in the delivery of hospital infrastructure due to the scale of the investments involved. In order to ensure that capital projects enhance, rather than compromise financial sustainability, it is vital that finance is obtained from the right source - whether that is government, international lending organisations, or private investors – and that it is provided as efficiently as possible.

This thesis has been concerned with the cost efficiency of private finance in the delivery of new hospital facilities. Through the PFI, successive governments in the UK have encouraged the use of private sector equity and debt in delivering new capital investment for the NHS even while most services remain publicly provided. Now, the model is increasingly being used to deliver new health care capital in the European Union and in many other countries.

The cost efficiency of this model of capital financing is determined to a significant degree by the return that the providers of capital are able to earn on their investments. The ability of the PFI to provide a cost efficient method of capital financing for health systems is in large part dependent on its ability to provide investments on which equity and debt investors extract only fair returns. The presence of excess returns to investors demonstrated in this thesis damage the economic and fiscal sustainability of the NHS by exerting a greater than necessary burden on acute sector revenue budgets and limiting the opportunities for additional investment that could further enhance the cost efficiency of the health system. With a concentrated market structure and a defective procurement process, there is a strong case for further government intervention in the form of price capping or regulation.

9.7 Future research priorities

In this final section of the thesis, opportunities for additional research are identified and discussed. Many of these relate directly to the limitations outlined in Chapter 6 of the thesis. In addition, there is a need for more comprehensive research on the links between the cost of PFI projects, the market power of dominant firms, and their influence on policy-making.

i. Triangulating the framework for assessing rates of return

A cost of capital benchmark that is different to the appropriate rate for the degree of risk to which cash flows are subject will lead to an inaccurate estimate of the excess return. In Chapter 7, an attempt is made to reduce the impact of this potential limitation by utilising cost of capital benchmarks that are based on the discounting methodologies cited by PFI investors themselves. While it is assumed that the discount rates cited by investors are a reliable source of data for these assessments, there is a possibility that the investors do not record these accurately. For example, it could be argued that firms have an incentive to cite injudiciously low discount rates in order to generate high discounted valuations of the firm.

To eliminate the possibility of bias, future studies may utilise a broader array of independently-derived methods for constructing cost of capital benchmarks. Such efforts are likely to utilise the Capital Asset Pricing Model (CAPM) discussed in Chapter 6 of this thesis due to its dominance in capital budgeting decisions. Under the CAPM, the cost of equity is found by multiplying the β of the investment by the *Equity Market Risk Premium* (EMRP) and adding this to the risk-free rate. In terms of the EMRP, a valid approach would have to consider the heterogeneity of estimation methods advocated by finance theorists indicated in Chapter 7. Equally difficult challenges are presented by β since there are no directly observable market data on which to base this value. A number of potentially useful methods are briefly reviewed in Chapter 7 (for example, the use of historical data relating to the returns performance of regulated utilises or the β of the major infrastructure funds), all of which lead to estimates of cost of capital somewhat below those utilised in this thesis.

A more complex method for calculating β is to consider the returns data relating to quoted companies that are involved in market activities with similar risk profiles to those undertaken within PFI projects (e.g. construction, facilities management). This would ensure that the β incorporates the risks inherent to PFI projects and in which the capital market is prepared to pay a premium to invest. Such estimates of β would have to make adjustments to the β in order to eliminate a number of distortions (Vecchi and Hellowell 2009), and in particular: a) that element of β that is attributable to each firm's financial leverage, which will be different to the leverage on the specific PFI project under consideration); (b) that element of the β that relates to those elements of risk allocated to non-investing parties to the project (primarily the public authority private sector subcontractors); and (c) the impact of bias that arises from the use of a data set from a limited time period.

ii. Expanding the data set and the definition of "return"

Due to the exemptions in the UK Freedom of Information Act (2000) and the Freedom of Information (Scotland) Act (2002), the group of projects which can be subjected to detail financial analysis is necessarily limited. In addition, as described in Chapter 6, recent case law indicates that financial models, in which much of the relevant data are to be found, are unlikely to become available. However, this is ultimately a matter for government policy. In the document outlining the terms of reference for the review of the PFI (HM Treasury 2011f), the government said it would seek in future to "[give] greater financial transparency at all levels of the project so that the public sector is confident that it is getting what it paid for, and that the taxpayer is sure it is getting a fair deal now and over the longer term" (p.4). The outcome of the review may create scope for a change in the FOI Act or a more flexible interpretation of the Act by the Information Commissioner's Office (at least in England). If more financial models become available the evaluation of investor returns can take place on a much larger data set than was possible in this thesis, enhancing the reliability of results.

In addition, it should be re-emphasised that the financial models that have been used to populate returns data utilised in this thesis (and to derive the benchmarks on which they are evaluated) contain only *projections* of costs and revenues, as estimated by Special Purpose Vehicles and their financial advisers at the time of financial close. In other words, they contain the *expected value* of future *cost and revenue* cash-flows, not their *actual value*.

However, it is possible that actual cash flows (positive and negative) that accrue to PFI investments may be substantially different to those projected at the point of financial close. For a complete and comprehensive evaluation of the cost of private finance, therefore, research is required that examines both projected and actual returns earned on projects.

Currently, insufficient data are available on actual cash flows for scholarly research to examine whether the projected returns are likely to be matched by actual returns (though supreme audit institutions such as the National Audit Office are in a different position), and the degree to which projected returns can be increased through processes such as refinancing or the sale equity by primary investors in the secondary market. Such research requires the "live" financial model used by the SPV and its creditors as the contract develops, and the current approach of the Information Commissioner in terms of financial models indicates that such data are unlikely to be available in the medium term. Again, the viability of such research hinges on government policy towards contractual transparency.

iii. Examining the returns to operators as well as investors

A further limitation of this study concerns the focus on returns to investors as distinct from the profitability of PFI projects for contractors and subcontractors. As noted by Shaoul *et al* (2008), the complex PFI structure creates the possibility of *transfer pricing*, whereby returns are projected to accrue to the subcontractor, rather than the SPV (and thereby remain invisible in the calculation of investor returns). There may be an incentive for contractors to structure things this way, in order to obscure the higher return in financial models (which do not disaggregate construction and operational prices into cost and profit components).

There is some evidence that higher profit margins are expected in construction contracts operated through PFI structures relative to non-PFI structures. For example, the House of Commons Public Account Committee stated (2003):

> "In 2000 Carillion plc [a major PFI contractor and investor] said that it expected higher construction profits on PFI work and had been achieving a profit margin of 2.7% against turnover while in 2001, the Kier Group said it had made returns of 2.5% of turnover compared with 1% on other contracts" (p.7).

It is evident that research on this topic is desirable in order to provide a more complete account of the efficiency of the PFI model from the perspective of health system purchasers.

iv. Expanding the analysis of market structure and competitiveness

In measuring the structure of the market for PFI investment, this thesis considers sales data in order to measure the size of the market and market share. In other words, the descriptions and analyses presented in Chapter 8 centre on the "effective competitors" in the market (NIESR 2006). This may be seen as problematic in terms of the assessment of entry/exit dynamics in particular, as it is likely that some bidders, though unsuccessful, will have impacted to some extent on the competitive environment. Because of the additional focus on the dynamics of the procurement process, this limitation is substantially addressed. However, it is evident that a quantitative analysis of competitiveness in procurement may fail to identify the extent to which a particular failed bidder provided a genuine competitive challenge. It is likely that qualitative research, undertaken on a small number of case studies, could address a research question on this issue comprehensively and accurately.

Other limitations of the examination of the procurement process are recorded in Chapter 6. This thesis examines the dynamics of negotiations in the preferred bidder process in which it is shown, for example, that major changes to the price and length of contracts, as well as the nature of the output specifications, are made in this phase of non-competitive (or bilateral monopoly) bargaining. The data used to populate this analysis were provided to the author in response to Freedom of Information Act request to the National Audit Office (2010b), and relates to just 15 schemes that reached financial close between 2003 and 2006 (a period of rapid growth in the PFI market, as recorded in Chapters 2 and 8). It is clear that a broader sample of schemes – and in particular a sample which includes projects that were signed over a broader time period - would enhance the reliability of this element of the study. Relatedly, a fuller analysis of the changes brought about by the Competitive Dialogue procedure would be achievable with similar data from more recently procured projects.

In addition, the section on the procurement process is of specific relevance to the assessment of market dynamics in *equity only*, as data is not available on the mechanisms by which senior debt finance is secured by SPVs on a project-specific basis. While it is evident that the competitiveness of the procurement process will have a significant impact on the operation of the debt markets (since a highly competitive procurement process will force bidders to seek the lowest possible cost of inputs, including the cost of external finance), the extent to which individual debt transactions are subject to competitive pressure would add to the analysis of debt market structure and dynamics in Chapter 8.

v. *Evaluating the role of the private sector in policy formulation*

As noted by industrial organisation scholar and former US anti-trust regulator William G. Shepherd, “policies influence markets; but also, powerful companies in those markets tend to influence the policies” (Shepherd 2005, p. 104). This thesis has shown that the structure and competitiveness of the market affords dominant firms substantial market power. It also examined the extent of private sector involvement in both formulating and implementing PFI policy in Chapter 2. As Hodge has pointed out (2010), private sector involvement in policy-making does not imply a conflict of interest or corruption, but it does demand “the need to think more carefully about the size of financial rewards, the existence and power of personal and corporate incentives, and the need to be vigilant about the price paid for PFI contracts” (p.3). This thesis has provided a formal analysis of the reasonableness of the financial rewards and, in demonstrating the existence of excess profits ultimately funded by the NHS, highlights significant implications for taxpayers and service users. However, a comprehensive evaluation of the extent of private sector influence on policy-making has yet to be provided. Addressing this lacuna in the literature may contribute to our understanding of how PFI has come to be pursued over such a long period, and by successive governments with notionally different values, despite widespread doubts about the model’s efficiency.

Appendix A: The distribution of cash flow (FCFBE & FCFP) on each project

Figure A1. **North Cumbria: projected free cash-flow to blended equity**

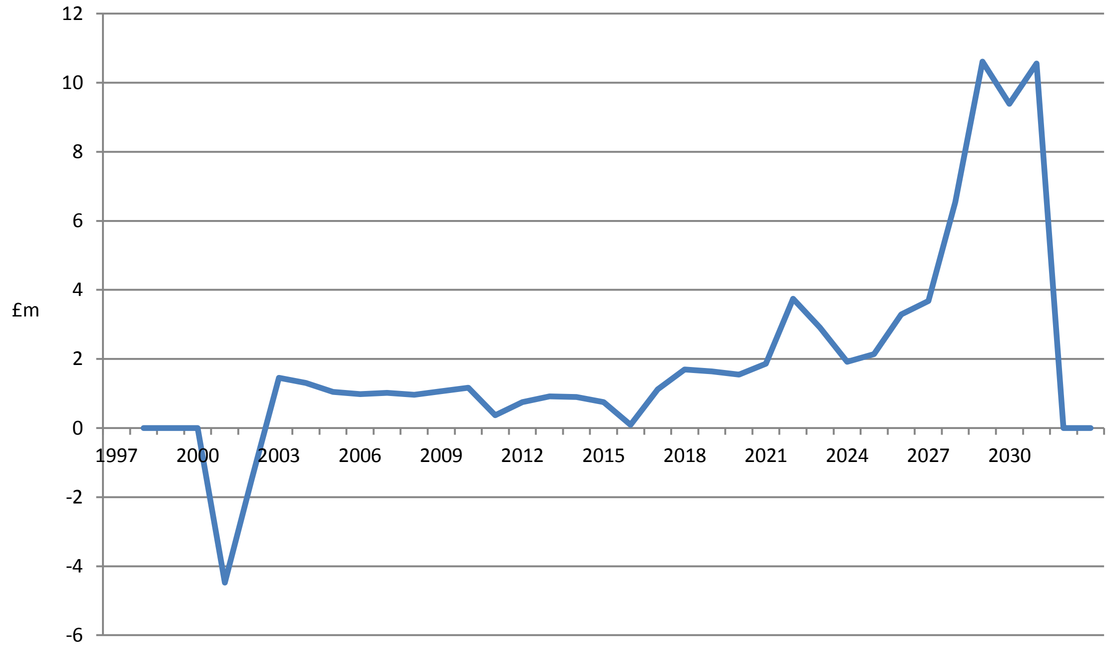
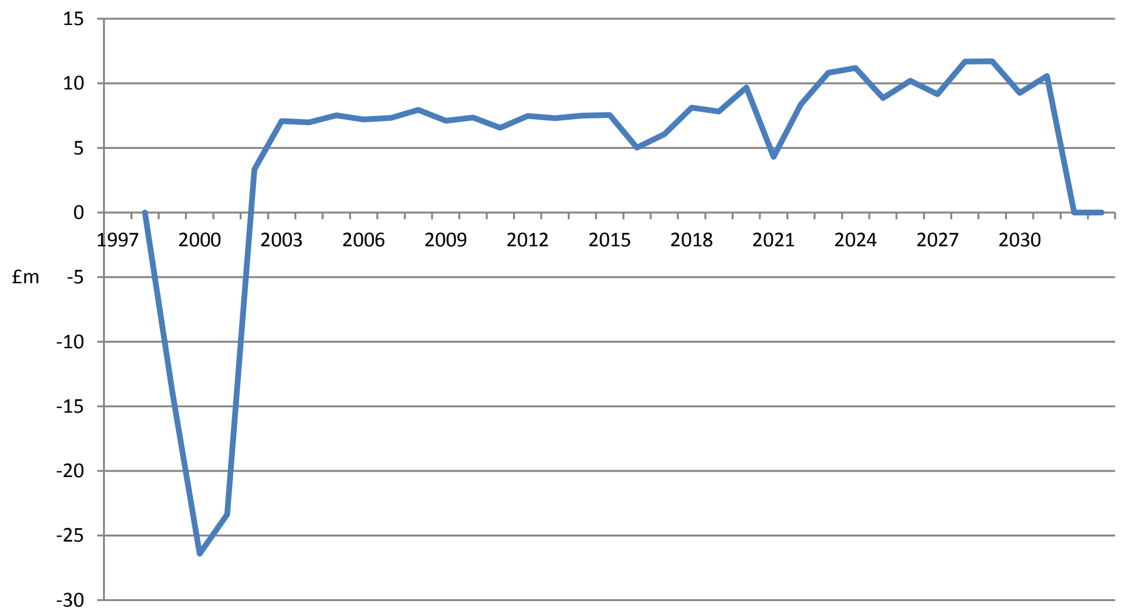


Figure A2. **North Cumbria: projected free cash-flow to the project**



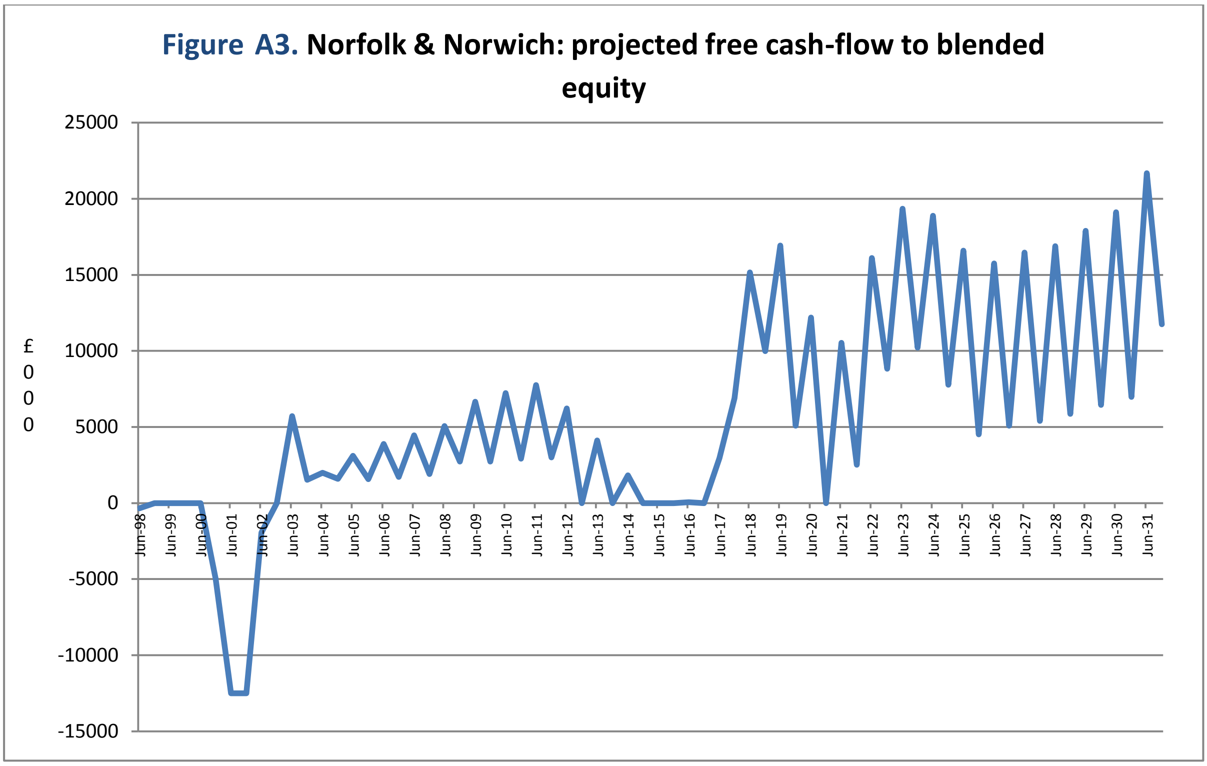


Figure A3. Norfolk & Norwich: projected free cash-flow to blended equity
25000
20000
15000
10000
5000
0
-5000
-10000
-15000
£000
Jun-98
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
Jun-10
Jun-11
Jun-12
Jun-13
Jun-14
Jun-15
Jun-16
Jun-17
Jun-18
Jun-19
Jun-20
Jun-21
Jun-22
Jun-23
Jun-24
Jun-25
Jun-26
Jun-27
Jun-28
Jun-29
Jun-30
Jun-31

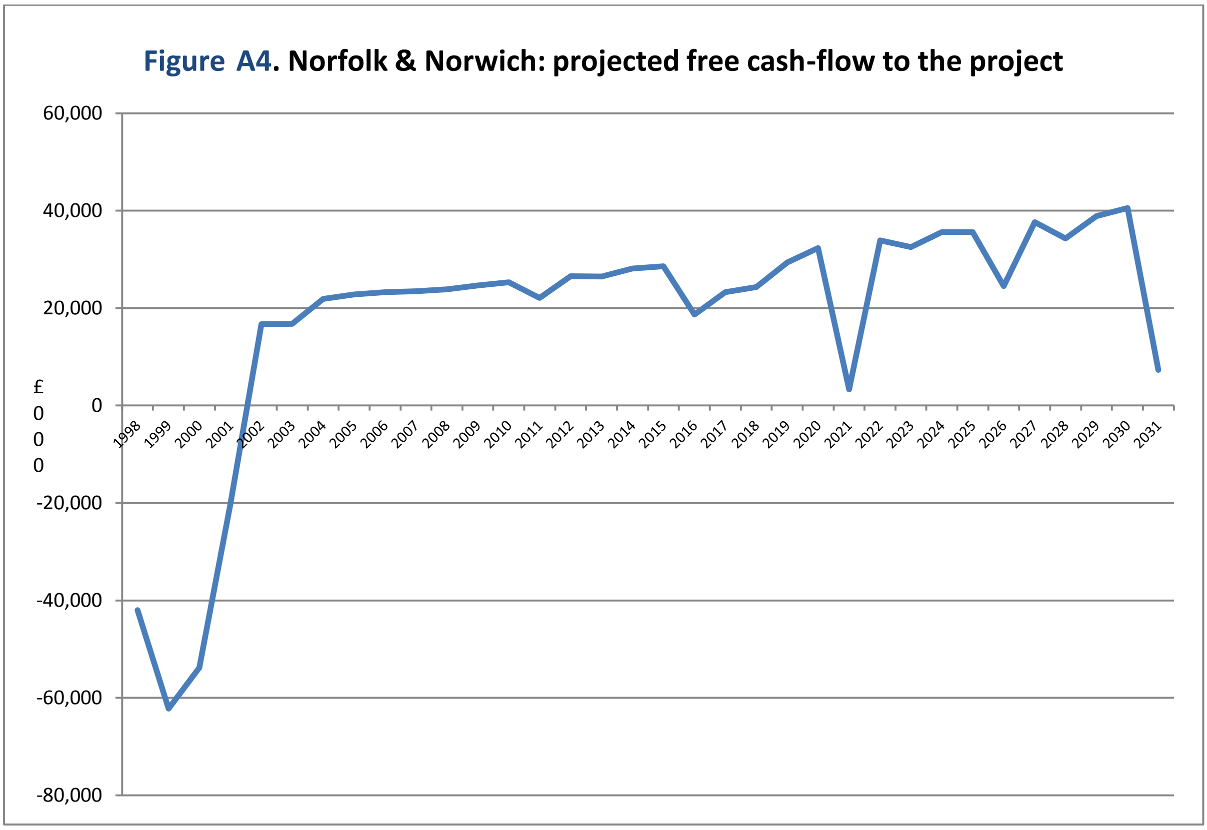
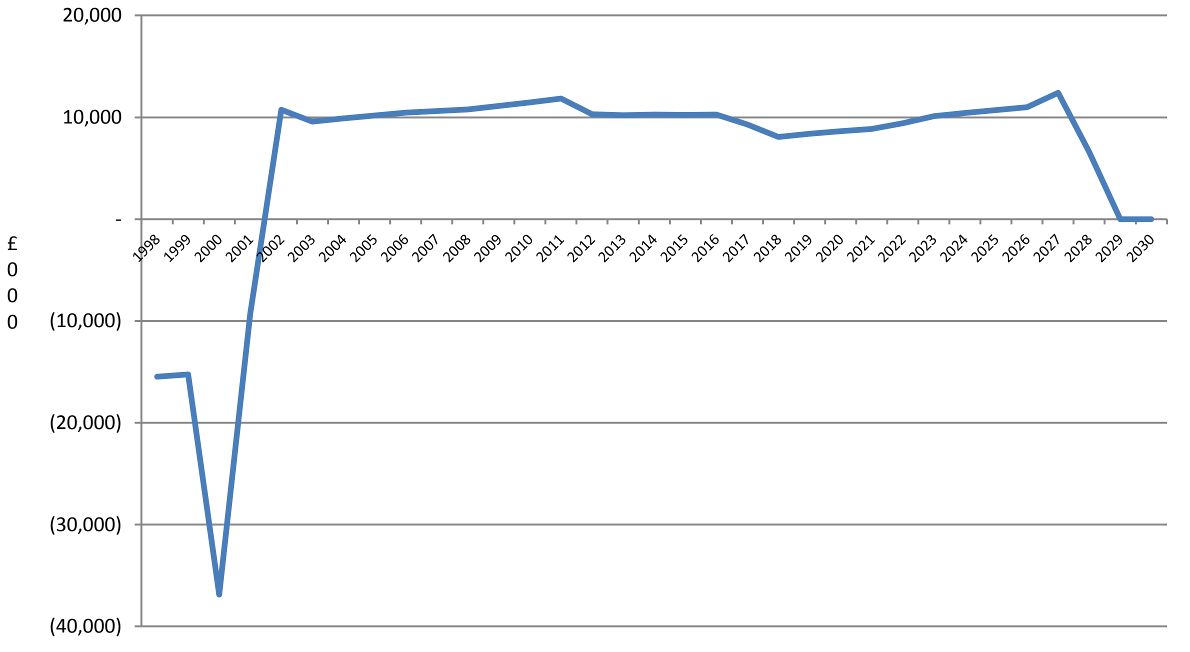


Figure A4. Norfolk & Norwich: projected free cash-flow to the project
60,000
40,000
20,000
0
-20,000
-40,000
-60,000
-80,000
£000
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031

(As noted above, the Free Cash Flow to Blended Equity is available for the County Durham & Darlington scheme only in respect of the first 10 years, and is not included here).

Figure A5. County Durham & Darlington: projected free cash-flow to the project



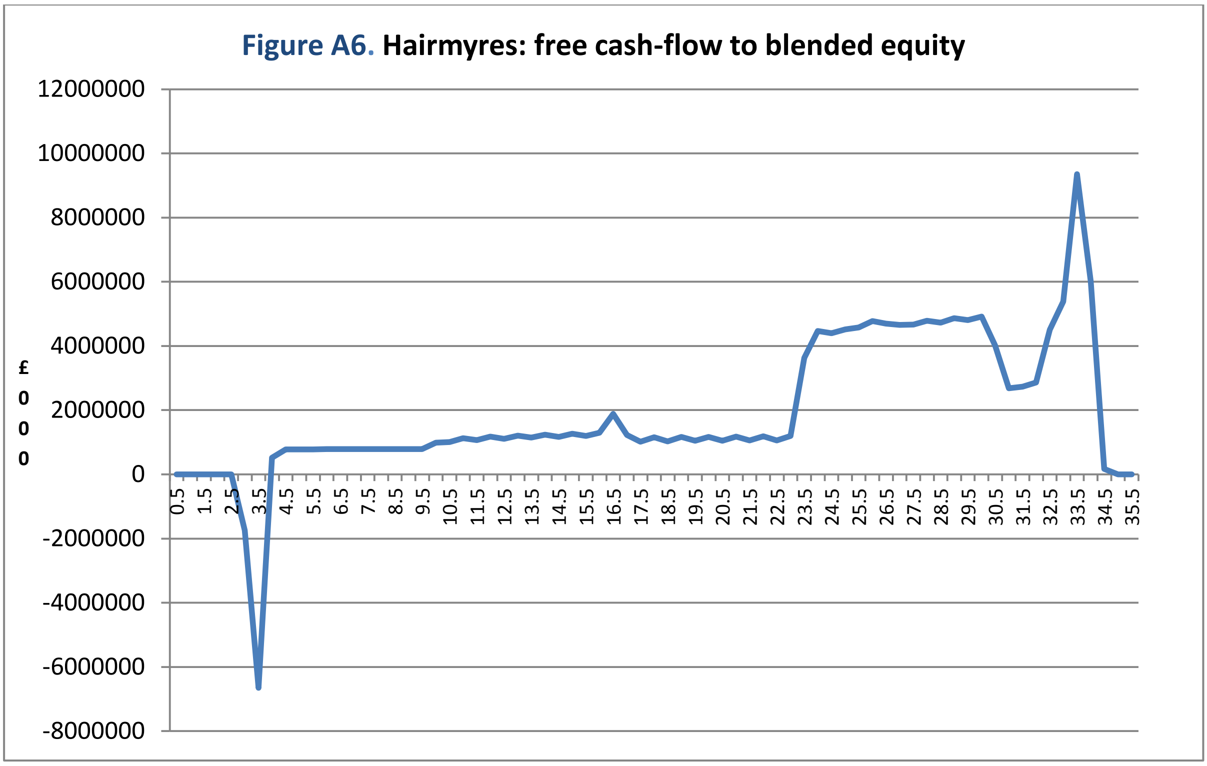


Figure A6. Hairmyres: free cash-flow to blended equity
12000000
10000000
8000000
6000000
4000000
2000000
0
-2000000
-4000000
-6000000
-8000000
£
0
0
0
0.5
1.5
2.5
3.5
4.5
5.5
6.5
7.5
8.5
9.5
10.5
11.5
12.5
13.5
14.5
15.5
16.5
17.5
18.5
19.5
20.5
21.5
22.5
23.5
24.5
25.5
26.5
27.5
28.5
29.5
30.5
31.5
32.5
33.5
34.5
35.5

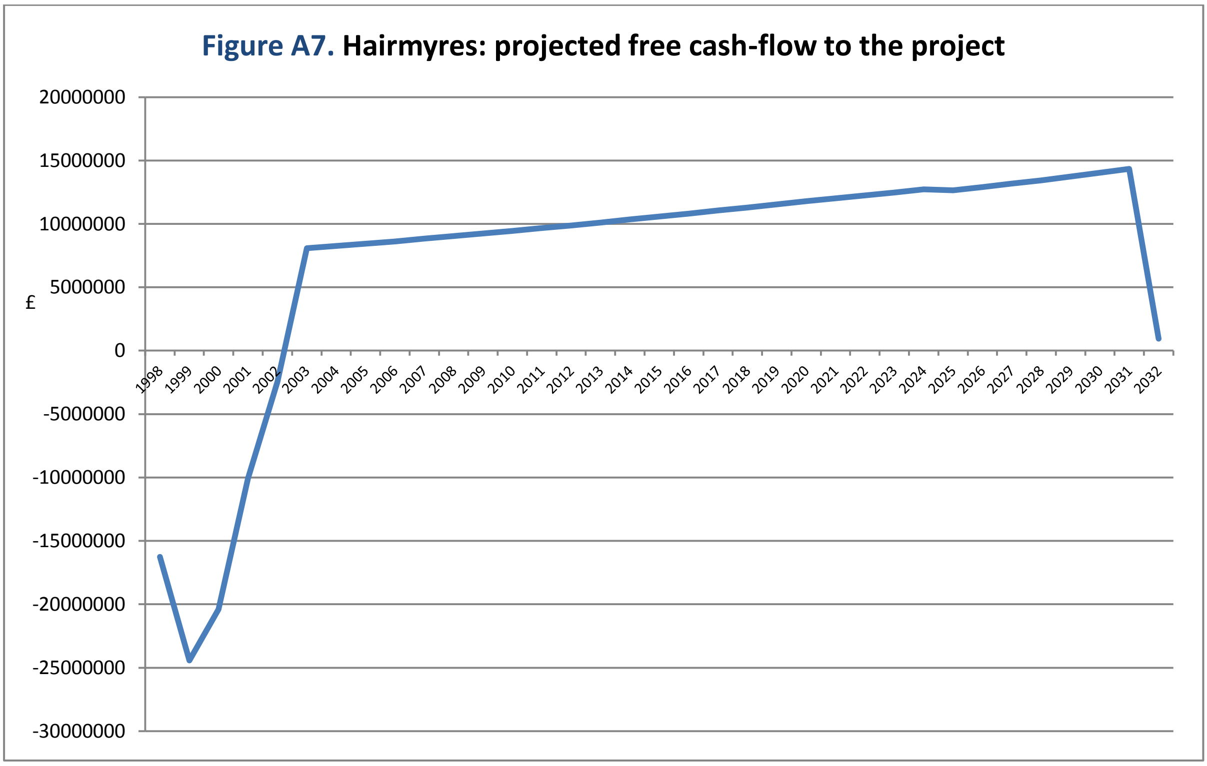


Figure A7. Hairmyres: projected free cash-flow to the project
20000000
15000000
10000000
5000000
0
-5000000
-10000000
-15000000
-20000000
-25000000
-30000000
£
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032

Figure A8. Wishaw: projected free cash-flow to blended equity

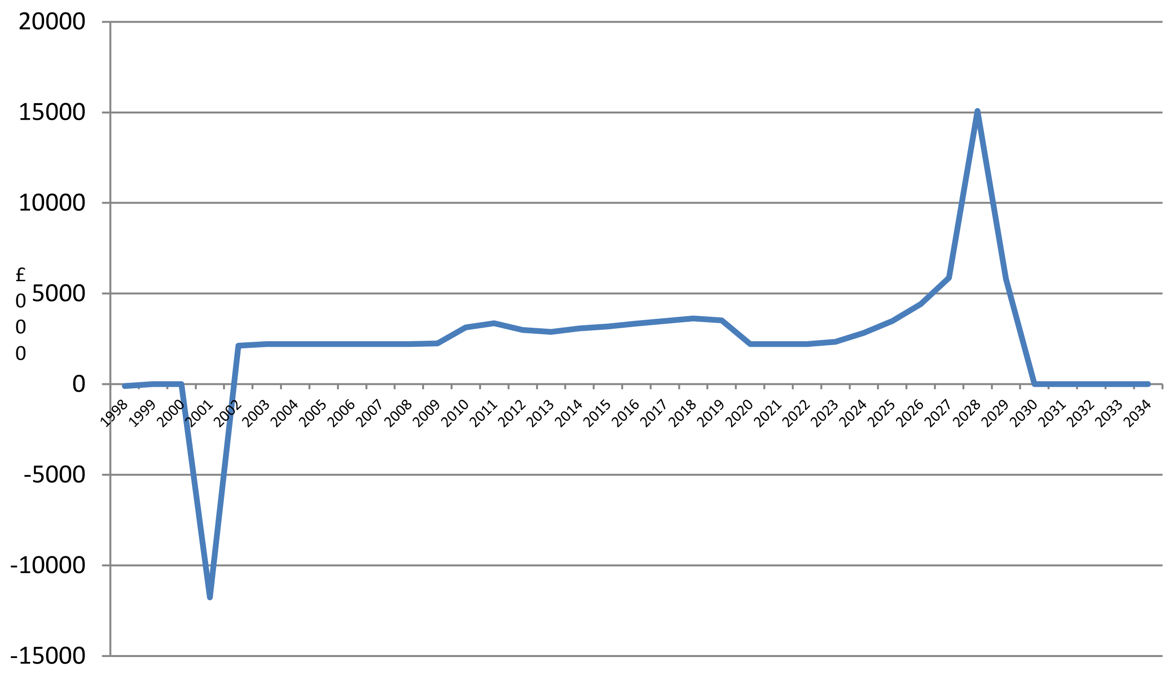


Figure A9. Wishaw: projected free cash flow to the project

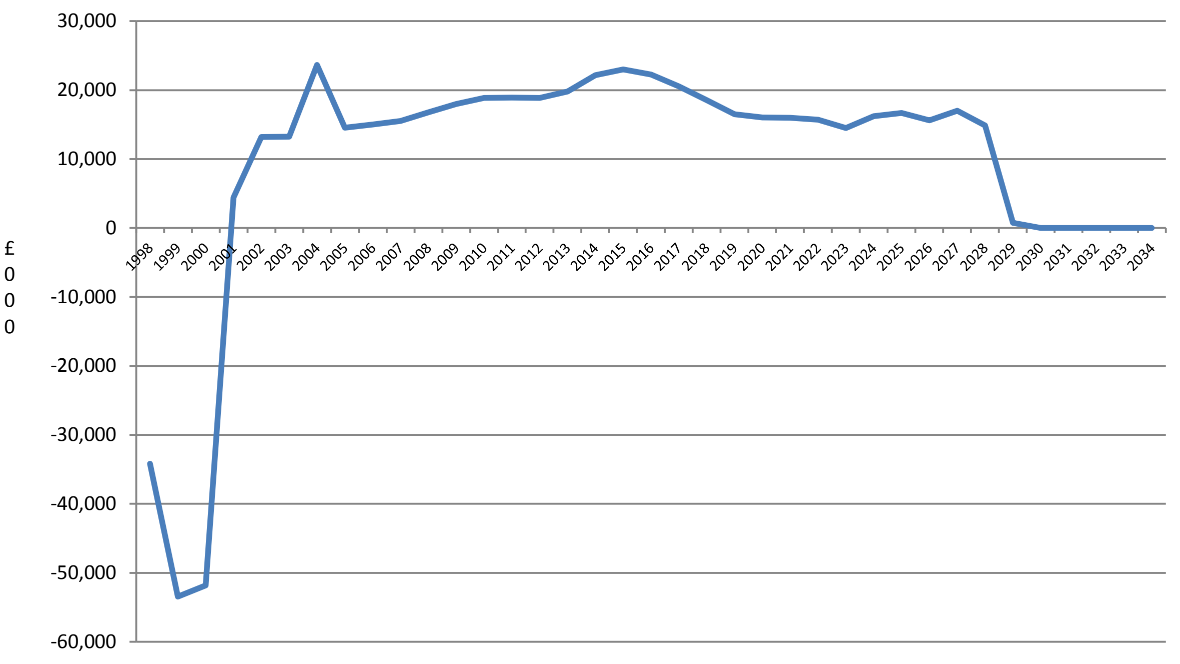


Figure A10. **Edinburgh: projected free cash flow to blended equity**

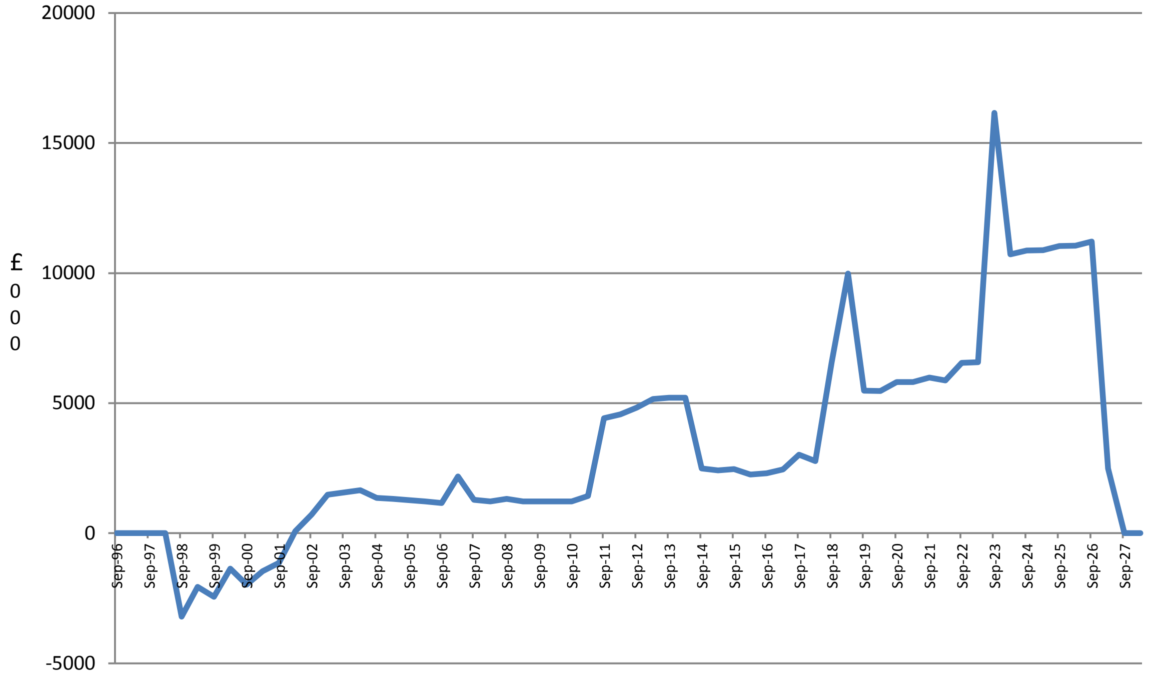


Figure A11. **Edinburgh: projected free cash flow to the project**

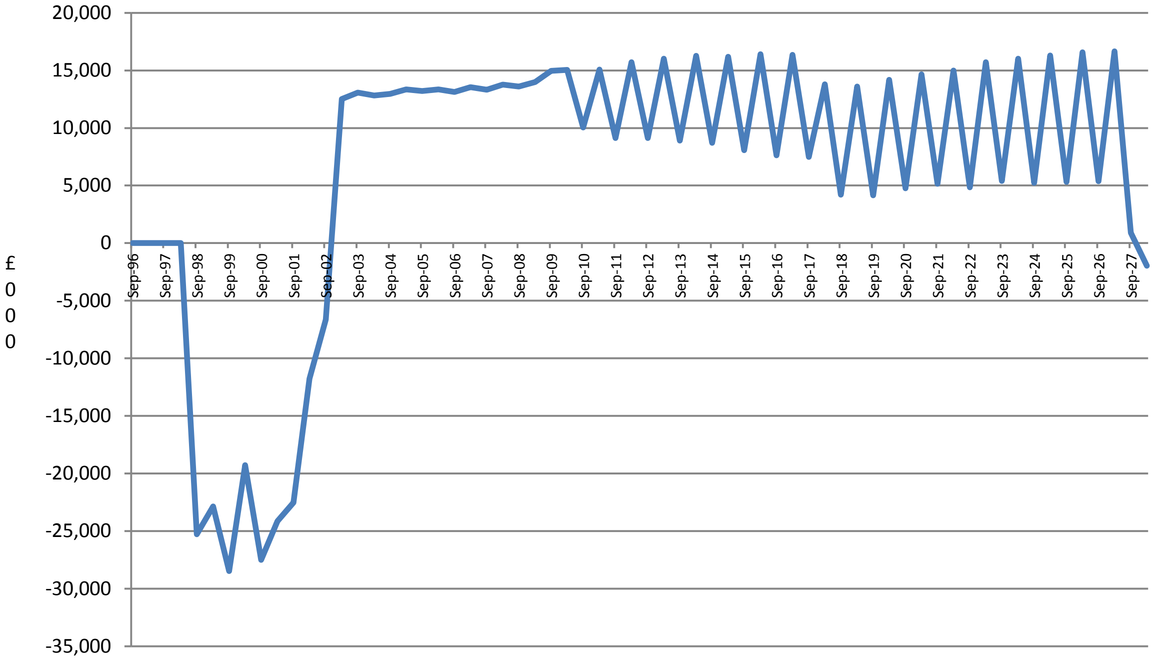


Figure A12. Nottingham: projected free cash flow to blended equity

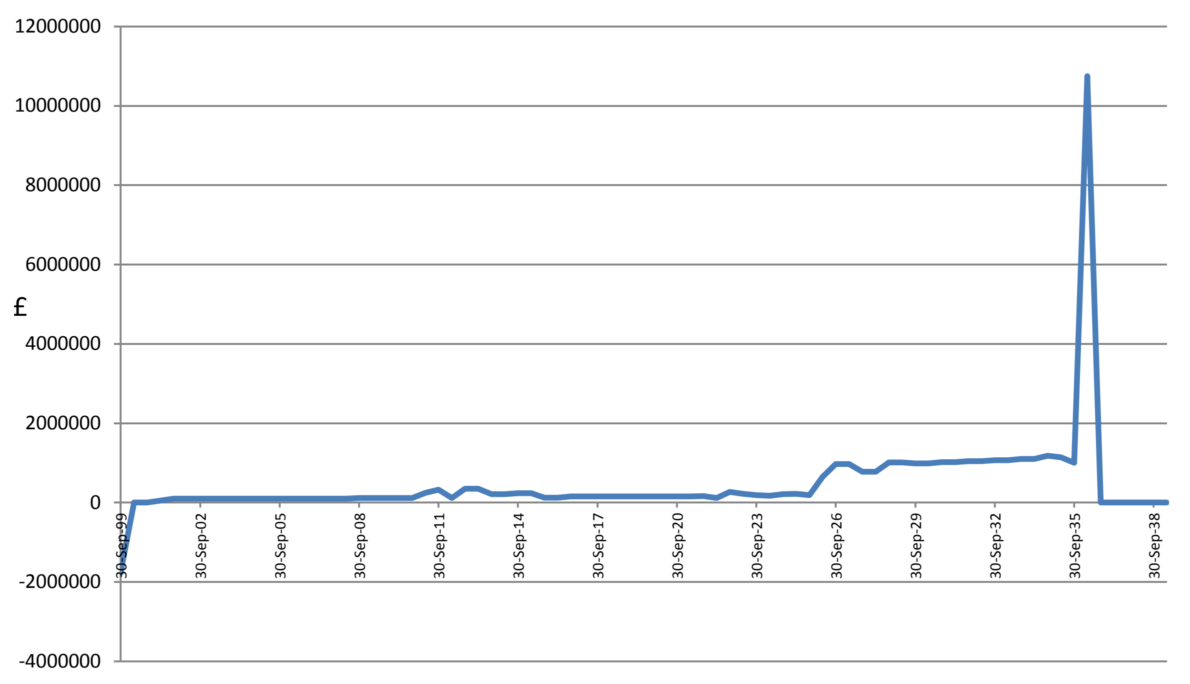


Figure A13. Nottingham: projected free cash flow to the project

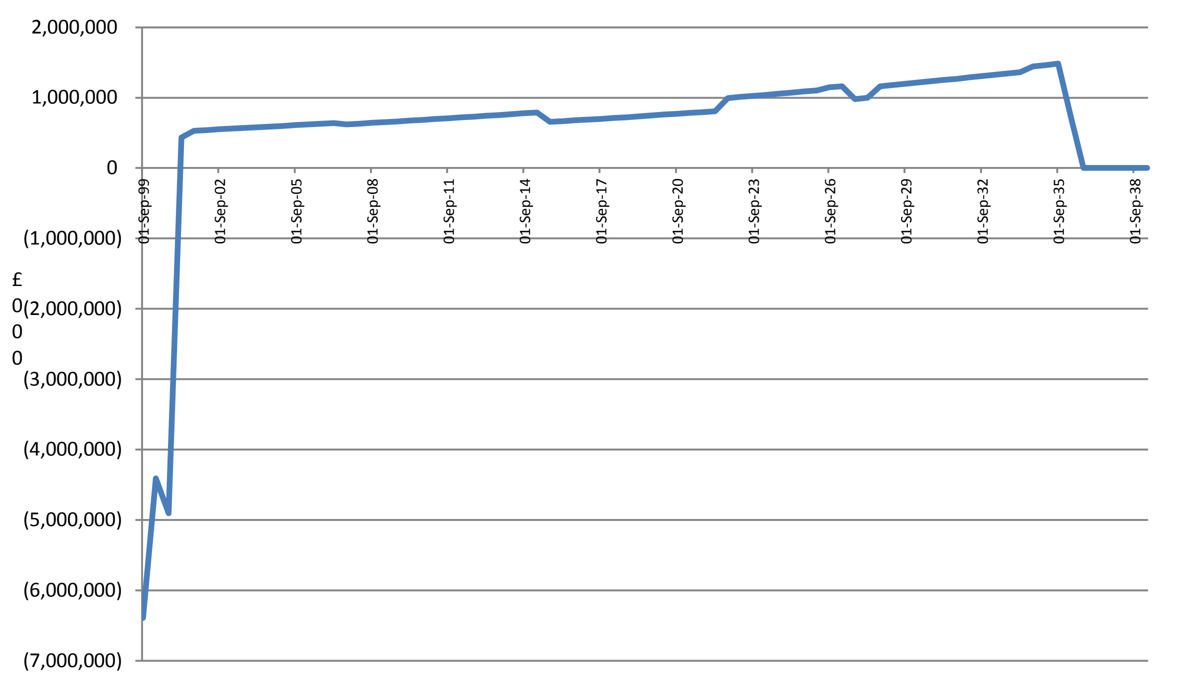


Figure A14. Hull & East Yorkshire - projected free cash flow to blended equity

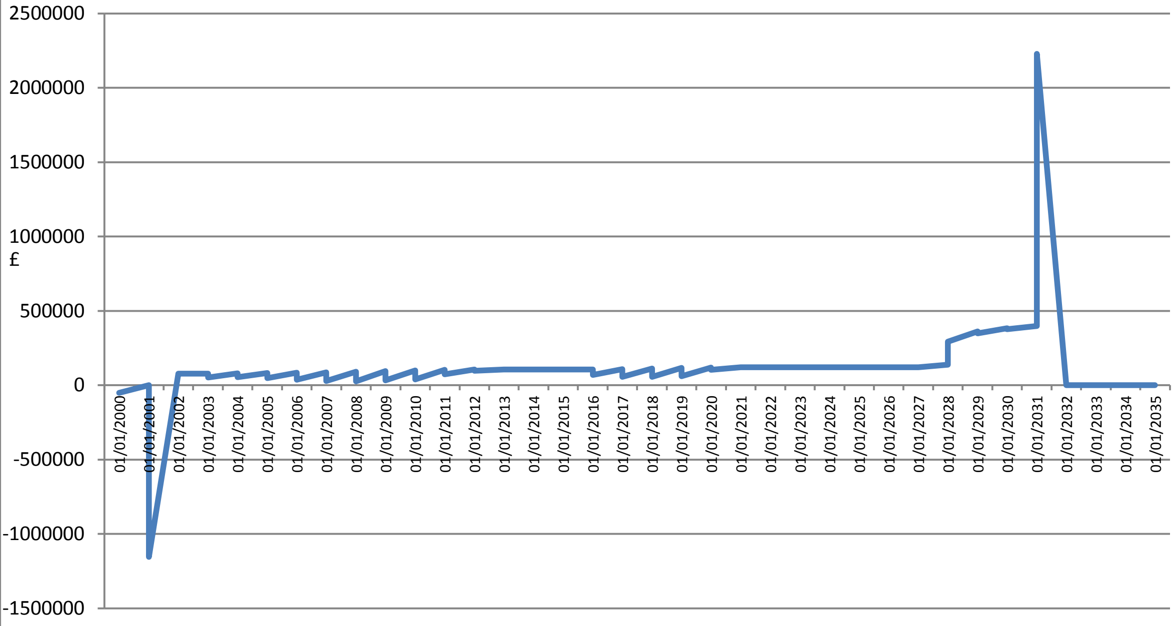
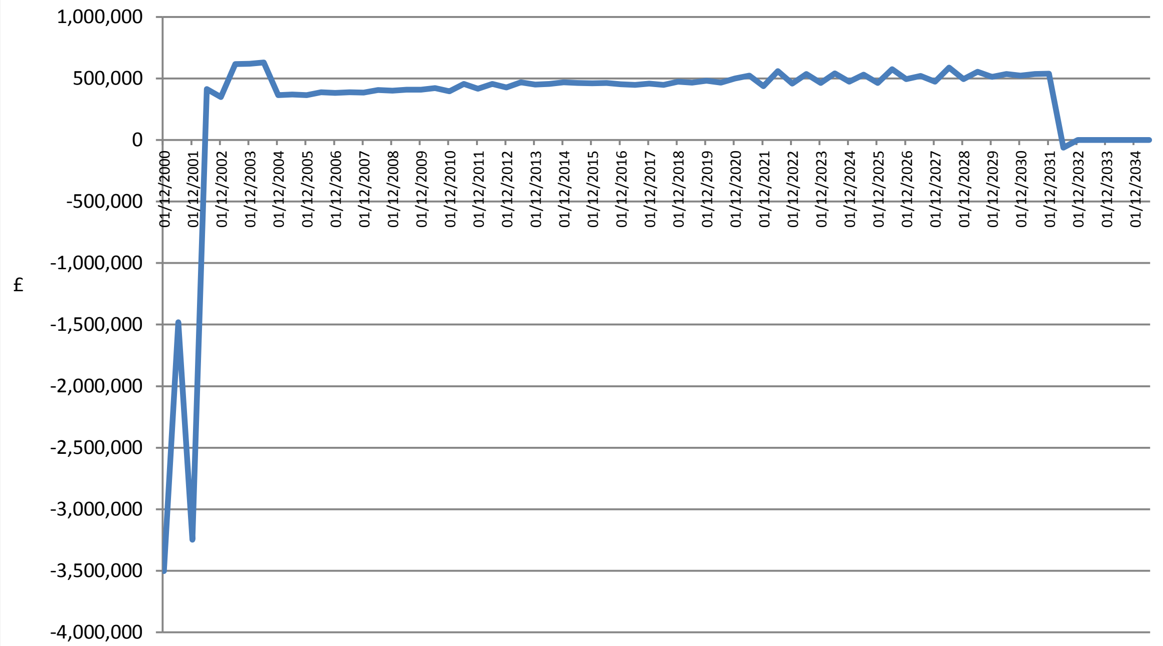


Figure A15. Hull & East Yorkshire - projected free cash flow to project



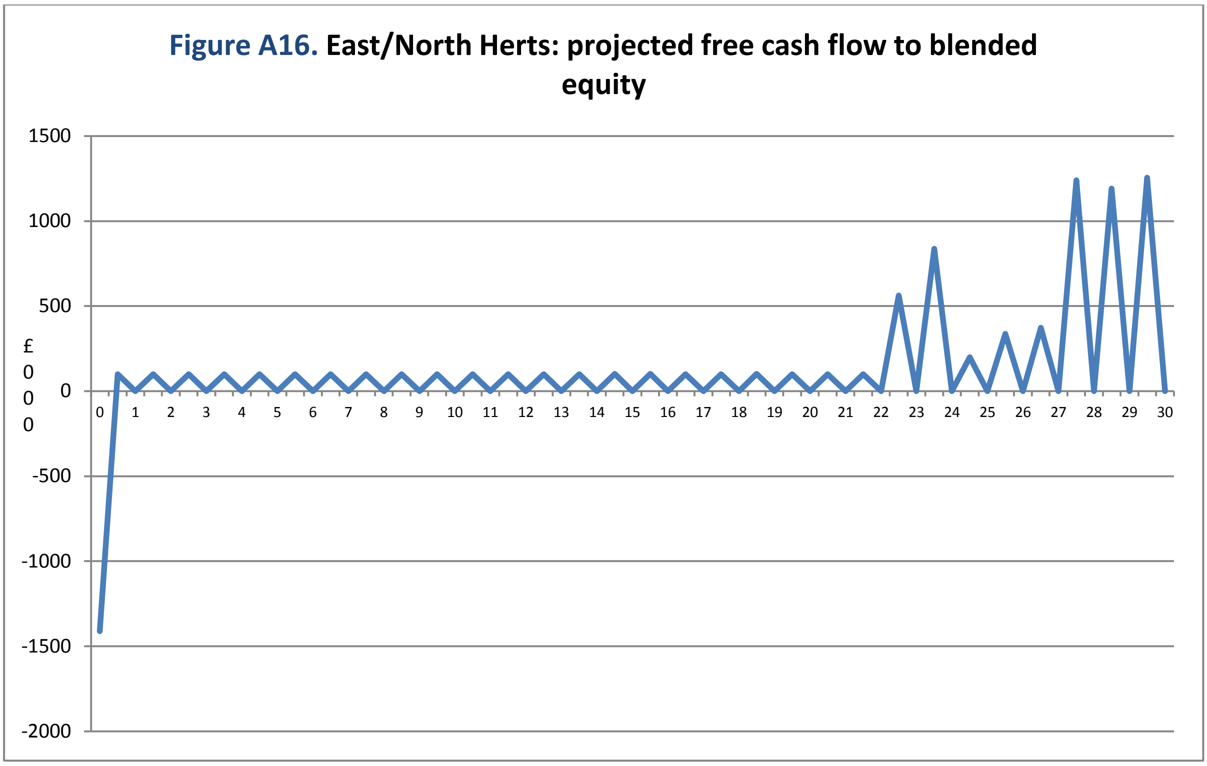


Figure A16. East/North Herts: projected free cash flow to blended equity
1500
1000
500
£
0
0
0
0
-500
-1000
-1500
-2000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

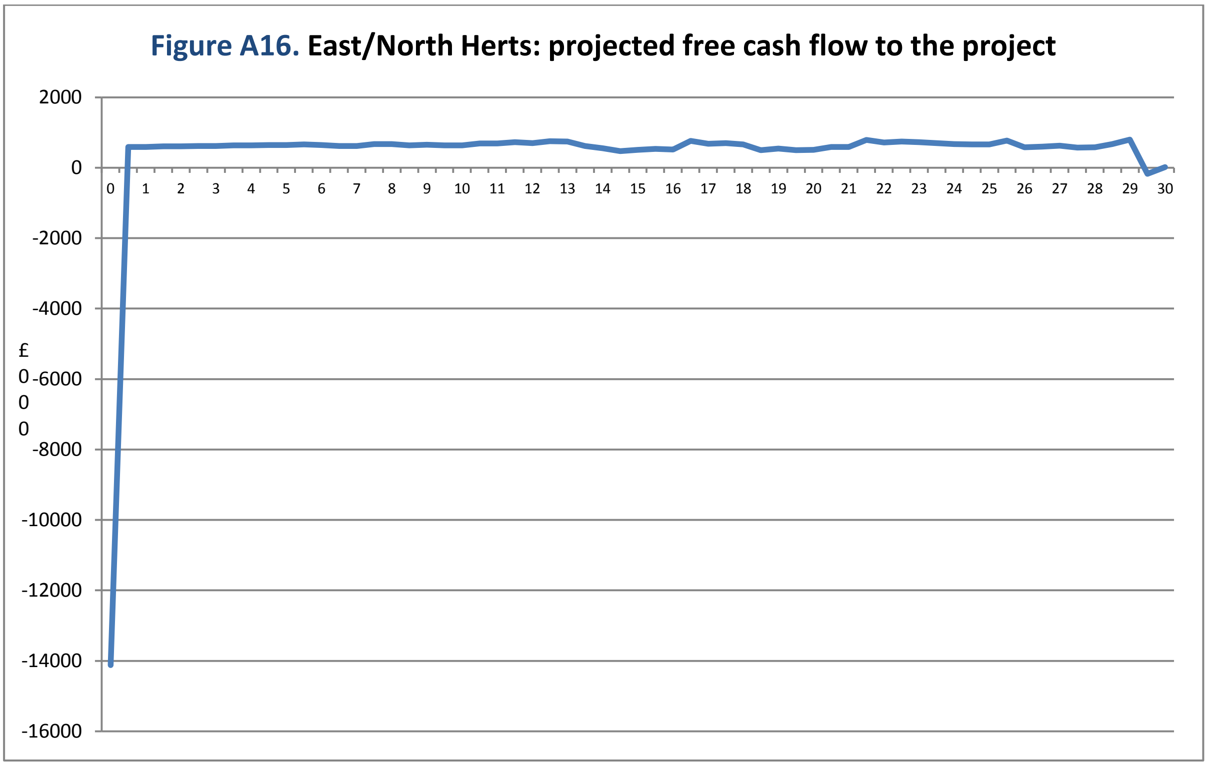


Figure A16. East/North Herts: projected free cash flow to the project
2000
0
-2000
-4000
£
0
0
0
-6000
-8000
-10000
-12000
-14000
-16000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

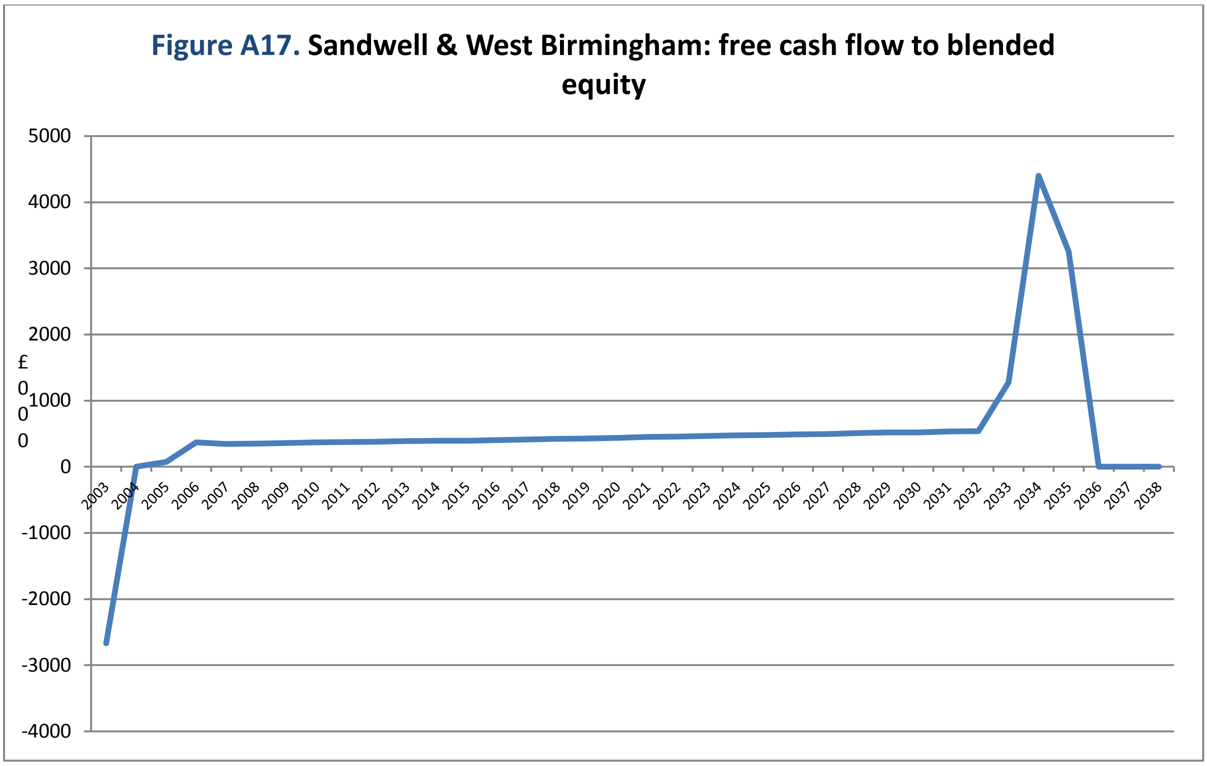


Figure A17. Sandwell & West Birmingham: free cash flow to blended equity
£000
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

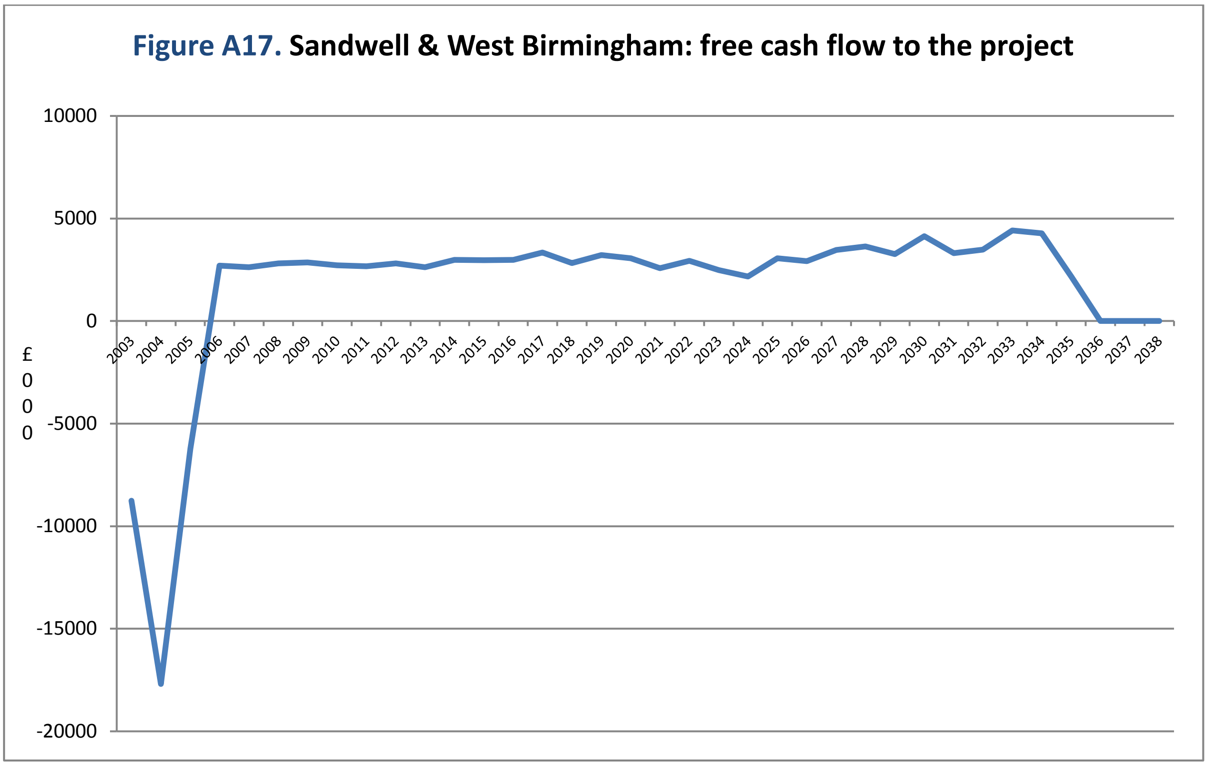


Figure A17. Sandwell & West Birmingham: free cash flow to the project
£000
10000
5000
0
-5000
-10000
-15000
-20000
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

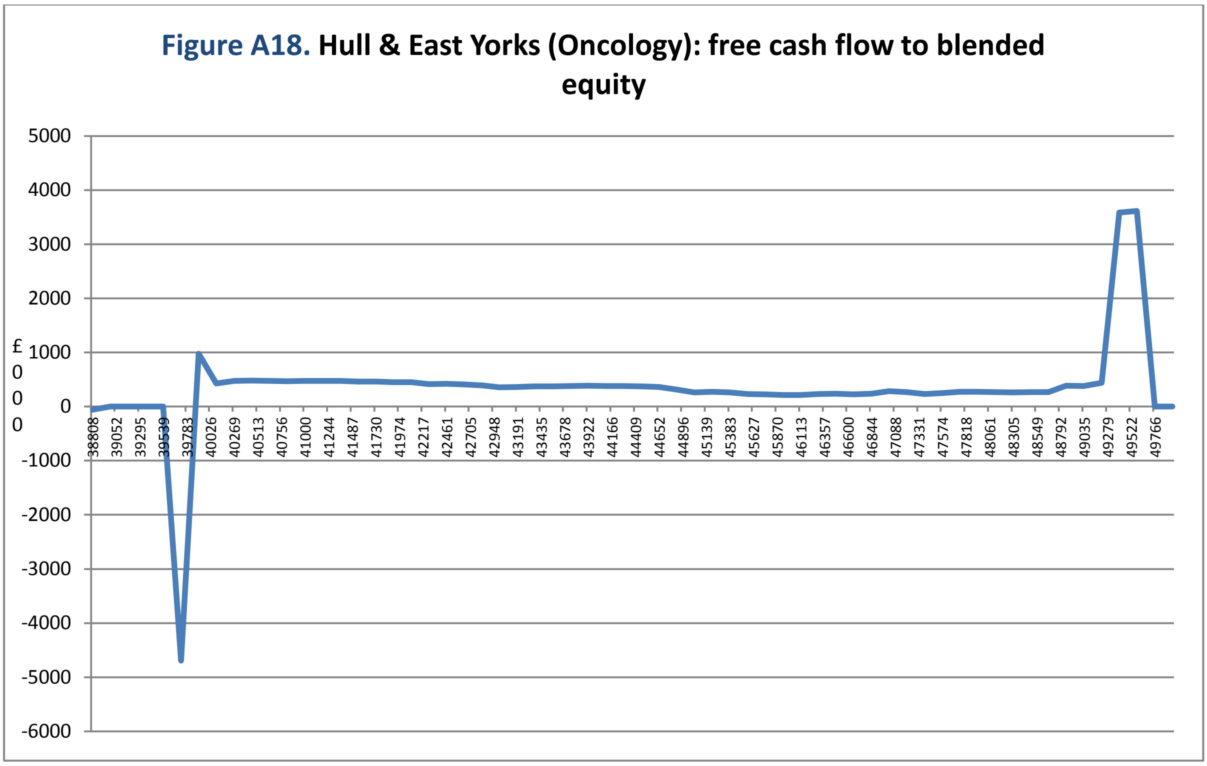


Figure A18. Hull & East Yorks (Oncology): free cash flow to blended equity
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
£000
38808
39052
39295
39539
39783
40026
40269
40513
40756
41000
41244
41487
41730
41974
42217
42461
42705
42948
43191
43435
43678
43922
44166
44409
44652
44896
45139
45383
45627
45870
46113
46357
46600
46844
47088
47331
47574
47818
48061
48305
48549
48792
49035
49279
49522
49766

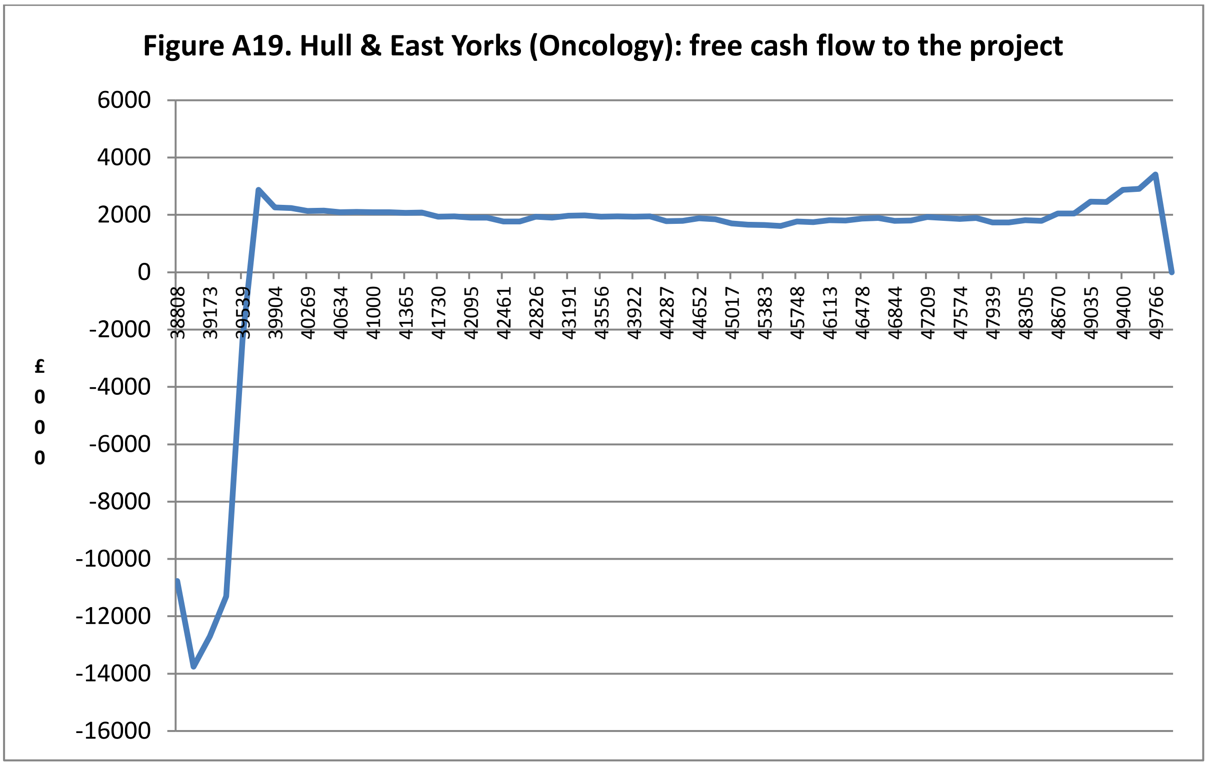


Figure A19. Hull & East Yorks (Oncology): free cash flow to the project
6000
4000
2000
0
-2000
-4000
-6000
-8000
-10000
-12000
-14000
-16000
£000
38808
39173
39539
39904
40269
40634
41000
41365
41730
42095
42461
42826
43191
43556
43922
44287
44652
45017
45383
45748
46113
46478
46844
47209
47574
47939
48305
48670
49035
49400
49766

Appendix B: Exploring the financial dynamics of the 11 data set projects

It is clear from the figures presented in Appendix A (above), that the profiles of cash flows for blended equity and for the project are very different. Specifically, the profile of the Free Cash Flow to Blended Equity is characterised by substantial degree of "back-ending", whereas project cash flow is characterised by a much more even profile.[108] As discussed in the main text of this chapter, where cash flow is clustered at the back end of contacts, the IRR formula will, by discounting at the IRR, generate a misleadingly low figure, whereas the Benefit Cost Ratio, as a simple discounted cash flow method, is a much more reliable measure of return. It is worth considering why this "back-ending" exists and the extent to which it has an influence on the cost-effectiveness of the overall financing structure.

The "back-ending" of blended equity cash flows occurs because senior debt lenders require, as a condition of their loans, that all scheduled payments of debt principal and interest are made before distributions to equity (dividends) are made to the shareholders of the SPV (John Laing plc 2011). This equity stake itself is also repaid at this time. Thus, while payments of debt and interest on the loan stock are made to the SPV throughout the contract, the bulk of the equity return – in cash terms at least - occurs at the end of the concession period, and after the senior debt has been paid. This period at the end of contracts in which the senior debt has been repaid, such that the entire project cash flow is available for distribution to SPV investors, is called the "tail period" (Yescombe 2008). Its existence builds in a safety margin for the senior debt provider, so that if a project runs into temporary difficulties and cash-flow is reduced, there may still be enough cash

[108] Though in the cases of North Cumbria, Norfolk and Norwich, Hairmyres and Nottingham, the project cash flow increases over time, at a rate linked to the Retail Price Index (e.g. RPI/2 in the case of Hairmyres). See Chapter 5 for a fuller discussion of the extent to which returns are affected by the risks of inflation/deflation.

generated to ensure that the debt can be repaid, albeit at a later phase of the contract period. In principle, the length of the tail period is determined by the degree of credit default risk in the project. The graph below shows the profile of the projected unitary change, project cash flows and senior debt payments for the NHS Lothian - Edinburgh scheme. The final senior debt payment is due to be made in September 2023, but the unitary charge continues to be paid until March 2028, generating project cash flows for a further four years. This cash flow is then available for distribution to SPV investors. In the following figure, these data are shown for the North Cumbria scheme, showing a 3.5 year tail period.

Figure B1. NHS Lothian (Edinburgh): nominal unitary charge, project cash-flow and senior debt service costs

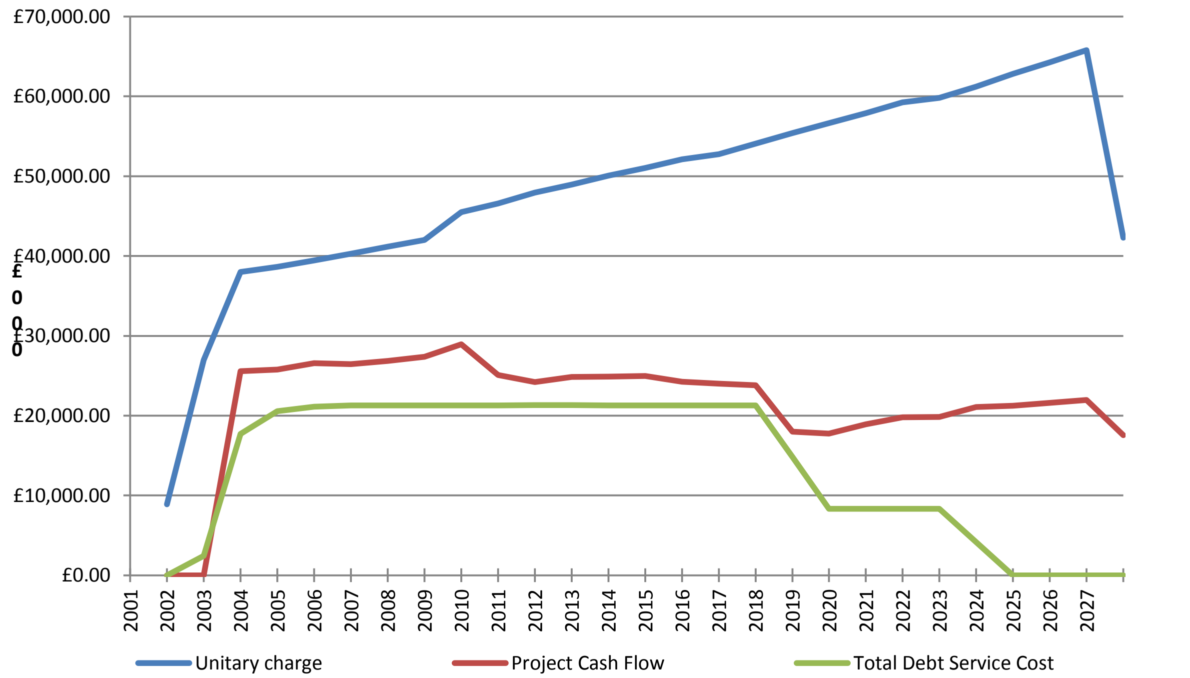
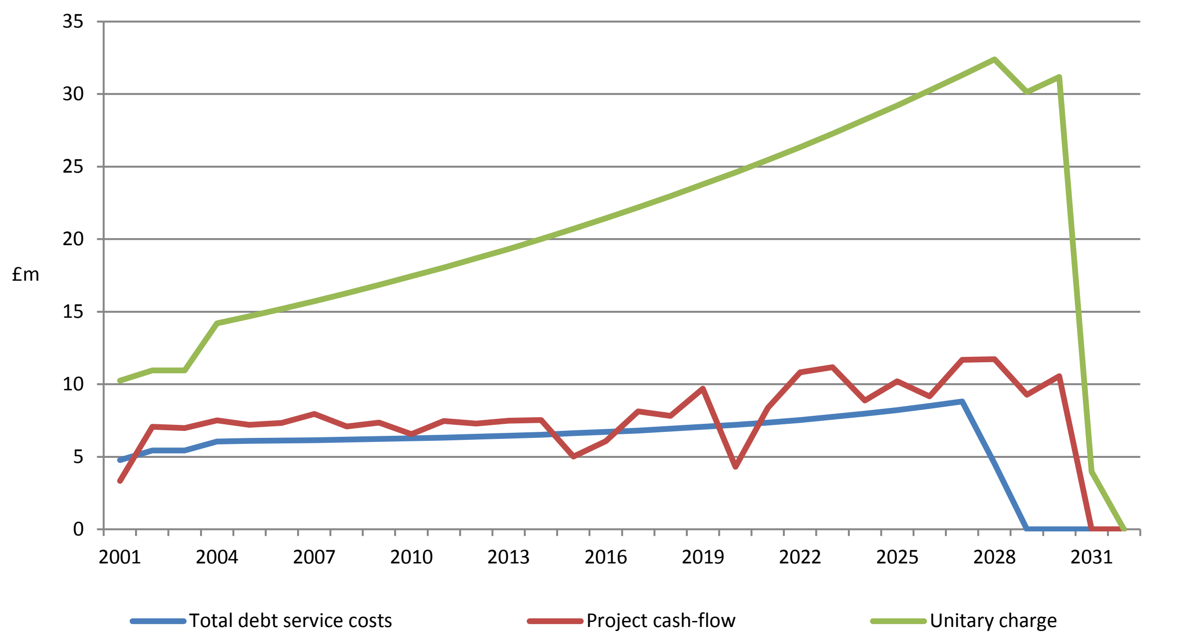


Figure B2. **North Cumbria: unitary charge, project cash-flow and senior debt service costs**



The length of the tail period is an important consideration in terms of the cost-effectiveness of the overall financing structure from the NHS purchaser's perspective. A longer tail period will increase the project cash flow because the senior debt is being repaid over a shorter period (Yescombe 2008). The impact is analogous to repaying a mortgage over 20 years, as opposed to 25 years – the shorter profile pushes up the periodic cost. During the tail period, the increase in the amount of free cash available for distribution to shareholders in the SPV is very substantial, but the impact on the Blended Equity IRR may not be significant, because of the extent to which the IRR undervalues cash received in the long term. Yescombe (2008) suggests that for an accommodation PFI project in an established market (such as the UK hospitals PFI market), it may be possible to negotiate a tail period as low as six months.

However, as can be seen in the table overleaf, tail periods on the 11 data set schemes are considerably longer, with a mean of 5.7 years, and a range of 2 to 13.5 years.

Another relevant feature of a PFI project's financial structure is the Annual Debt Service Cover Ratio – which indicates, in each year or half-year, the ratio of the amount of cash available to meet interest payment and principal repayment requirements on the senior debt to the amount of senior debt interest and principal repayments required (Yescombe 2008). In other words, the ADSCR relates the amount of cash that is projected to be generated by the project before senior debt payments are made, to the value of those payments. Thus,

$$ADSCR = \frac{\text{Available Cash Flow Before Debt Service}}{\text{Debt Service}}$$

Senior lending covenants often stipulate a minimum ADSCR below which it cannot fall (this is typically 1.10-1.20 according to Yescombe (2008). If the project ADSCR falls below this value – often termed the "the lock-up value" (John Laing plc 2011) through insufficient cash flow, distributions to shareholders are prevented until adequate funds are available to allow the ADSCR to return above the lock-up threshold. If default is reached, the senior lender can require its debt to be repaid, or take over control of the project from shareholders.

The higher the ADSCR on a project, the more cash it generates in excess of that sufficient to make senior debt costs. Therefore, there is a link between the size of the ADSCR and the return on blended equity. The table overleaf shows that the average ADSCR on the seven projects for which there is available data is 1.39 (with a range between 1.22 and 1.54).

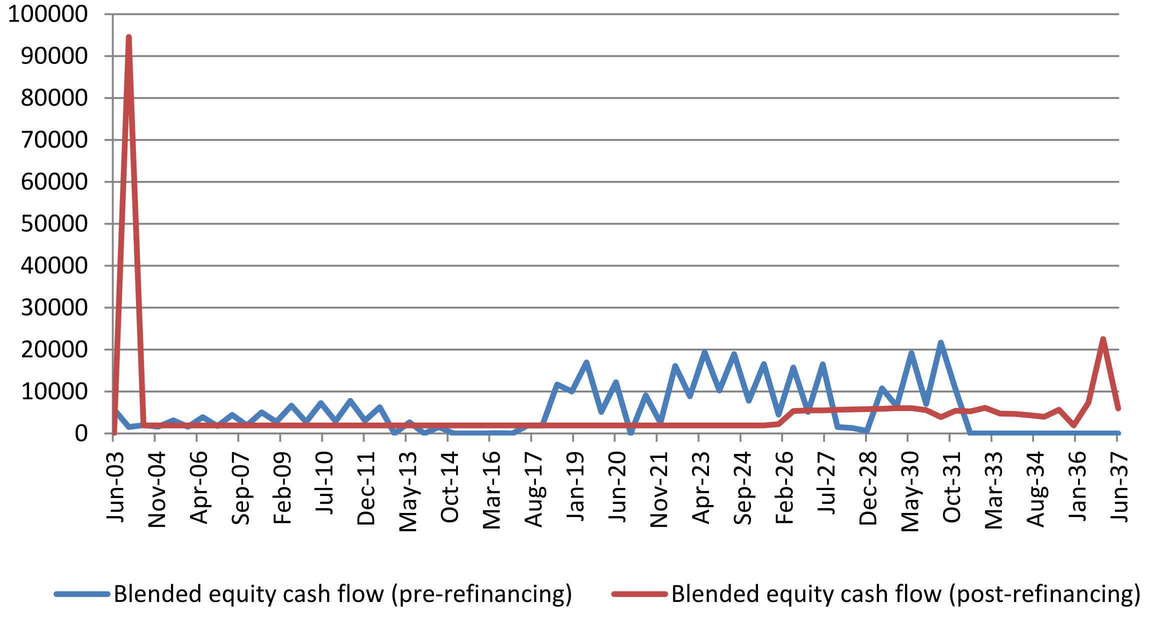
<table>
<tr><th colspan="7">Table B1. Minimum and average ADSCRs and tail periods on the data set projects</th></tr>
<tr><th rowspan="2">NHS Trust/Board</th><th colspan="4">Annual debt service cover ratio (ADSCR)</th><th colspan="2" rowspan="2">Tail period</th></tr>
<tr><th colspan="2">Minimum</th><th colspan="2">Average</th></tr>
<tr><td>North Cumbria
Cumberland Infirmary rebuild</td><td colspan="2">1.28</td><td colspan="2">1.54</td><td colspan="2">3.5</td></tr>
<tr><td>Norfolk/Norwich
Acute hospital rebuild</td><td>Base Case
1.20</td><td>Post-refinancing
1.20</td><td>Base Case
1.42</td><td>Post-refinancing
1.2</td><td>Base Case
13.5</td><td>Post-ref.
1</td></tr>
<tr><td>Durham and Darlington
General Hospital rebuild</td><td colspan="2">-</td><td colspan="2">-</td><td colspan="2">-</td></tr>
<tr><td>NHS Lanarkshire
Hairmyres Hospital rebuild</td><td colspan="2">1.20</td><td colspan="2">1.3</td><td colspan="2">10</td></tr>
<tr><td>NHS Lanarkshire
Law hospital rebuild (Wishaw)</td><td colspan="2">1.20</td><td colspan="2">-</td><td colspan="2">1.5</td></tr>
<tr><td>NHS Lothian
Royal Infirmary of Edinburgh</td><td colspan="2">1.18</td><td colspan="2">1.52</td><td colspan="2">4</td></tr>
<tr><td>Nottingham University
Queen’s Medical Centre rebuild</td><td colspan="2">1.20</td><td colspan="2">1.32</td><td colspan="2">10</td></tr>
<tr><td>East/North Hertfordshire
Herts and Essex hospital</td><td colspan="2">1.20</td><td colspan="2">-</td><td colspan="2">4</td></tr>
<tr><td>Hull/ East Yorks Hospitals
Castle Hill hospital rebuild</td><td colspan="2">1.20</td><td colspan="2">1.39</td><td colspan="2">2.5</td></tr>
<tr><td>Sandwell/West Birm’m
Ambulatory care centre</td><td colspan="2">1.18</td><td colspan="2">1.22</td><td colspan="2">2</td></tr>
<tr><td>AVERAGE (RANGE)</td><td colspan="2">1.20 (1.18-1.28)</td><td colspan="2">1.39 (1.22-1.54)</td><td colspan="2">5.7 (2-13.5)</td></tr>
</table>

Appendix C: the impact of refinancing on blended equity and project cash flows: the case of the Norfolk and Norwich PFI hospital

The financial model for the Norfolk and Norwich PFI hospital contains both pre- and post-refinancing cash flow data and is thus a useful source of information on this process (see Chapter 2 for a description of the refinancing process, and Chapter 4 for a brief review of the literature on the topic). In this appendix, the actual/projected free cash flow to blended equity is presented in respect of both the pre- and post-refinancing models, and these are compared. The IRRs and BCRs on these cash flows are also presented and discussed.

The graph overleaf illustrates the significant changes in the cash flow projections in the pre- and post-refinancing financial models. In the pre-refinancing model, the profile of the cash flow is “back ended”, with the bulk of cash flow projected to accrue to the later years of the contract i.e. from 2018 to 2031, the final year of the contract. As recorded above, the IRR on this cash flow is 18.6% and the Benefit Cost Ratio (on the basis of the higher Equity Risk Premium assumption) is 4.78. In contrast, in the post-refinancing scenario, the distribution of cash flow becomes dramatically “front-ended”, with a large proportion of cash flow now projected to be received in the first few years of the contractual period. In the post-refinancing model, the IRR on this cash flow is projected to increase significantly, to 60.4%. However, the financial model makes clear that the increase in the IRR is a reflection, not of the increased return (the net present value of the return hardly changes between the pre- and post-refinancing model), but is simply related to the change in cash flow profile – i.e. a move to a back-ended distribution (in which the return is undervalued by the IRR formula) to a front-ended distribution (in which the return is overvalued by the IRR formula). Interestingly, the BCR on the basis of the higher ERP increases only very marginally on the pre-refinancing figure, to 4.84. This provides further illustration of the extent to which the IRR privileges the short term.[109]

Figure C1: Blended equity cash-flow (pre- and post-refinancing on the Norfolk and Norwich University Hospital PFI contract



[109] Gains from refinancing are, as a matter of Treasury guidance (HM Treasury 2007c), shared with the public authority involved in the contract. The proportion of gains shared with the public sector varies according to when the contract was signed. For contracts that signed before September 2002, a "code of practice" (HM Treasury 2002) stipulates that the public sector should share 30% of the gain (though there is no formal requirement for investors to do so). Between September 2002 and November 2008, Treasury guidance stipulated that a 50% share should be written into contracts (HM Treasury 2007). The current guidance retains this proportion for gains up to £1 million, rising to 70% share for the public sector when a refinancing gain is in excess of £3 million (HM Treasury 2008). Currently, refinancing gains are calculated by using the pre-refinancing base case blended equity IRR to discount the post-refinancing base case blended equity cash-flows. The resulting NPV is the basis of the gain-sharing arrangement. The logic for this methodology is that the blended equity IRR is the best estimate of the investor's cost of equity capital (National Audit Office 2006).

REFERENCES

Abadie, R (2009), *Emerging Procurement Models.* Speech to the Partnerships UK annual conference, 15 October 2009. (City and Financial, London).

Ahn, S (2001), *Firm Dynamics and Productivity Growth: A Review of Micro Evidence from OECD Countries*, OECD Economics Department Working Papers, No. 297, (OECD, Paris).

Akbiyikli, R. D. Eaton and A. Turner, (2006), 'Project Finance and the Private Finance Initiative (PFI)', *Journal of Structured Finance*, Vol. 12 (2), pp. 67-75.

Allen & Overy (2010), *Global Guide to public-Private Partnerships.* (Allen & Overy, London).

Al-Shammari, H (2002), *Structure-Conduct-Performance and efficiency in Gulf co-operation council banking markets.* PhD thesis. (University of Wales, Bangor) (Unpublished).

Arrow, K. and R. Lind (1970), 'Uncertainty and the Evaluation of Public Investment Decisions', *American Economic Review,* June 1970, pp. 364-378.

Arthur Andersen and Enterprise LSE (2000), *Value for Money Drivers in the Private Finance Initiative*, (HM Treasury, London).

Asenova, D. and M. Beck (2010), 'Crucial silences: When accountability met PFI and finance capital'. *Critical Perspectives on Accounting.* Vol. 21, pp. 68-75.

Australian Government (2008), *National Public–Private Partnership Guidelines: Volume 5: Discount Rate Methodology Guidance*, December, Commonwealth of Australia. Available at: www.infrastructureaustralia.gov.au. [Accessed: 02 April 2010].

Bain, J (1951), 'The relation of profit to industry concentration: American manufacturing 1936-1940', *Quarterly Journal of Economics,* 65 (3), pp. 33-48.

_______ (1954), 'Economies of Scale, Concentration, and the Conditions of Entry in Twenty Manufacturing Industries', *The American Economics Review,* Vol. 44 (1), pp. 15-39.

_______ (1956), *Barriers to new competition.* (Harvard University Press, Cambridge).

_______ (1959), *Industrial Organization*. (Wiley, New York).

Baldwin, R. M. Cave and M. Lodge (eds.) (2010), The Oxford handbook of regulation. (Oxford University Press, Oxford).

Balfour Beatty (2003), *Balfour Beatty in PPP/PFI: Presentation by Ian Rylatt, Managing Director, Balfour Beatty Capital Projects Ltd*. PFI seminar. June 2003. London.

Ball, L. and A. Chen (2010), 'PPP: Export Credit Agencies and Multilateral Agencies'. In Lee, D. et al (eds.): *Global Guide to Public-Private Partnerships*. (Allen & Overy, London), pp. 313-326.

Bank for International Settlements (2011), *Basel III: A global regulatory framework for more resilient banks and banking systems (rev June 2011),* (Bank for International Settlements, Basel, Switzerland).

Barking, Havering & Redbridge Hospitals NHS Trust (2004), *Oldchurch Hospital Redevelopment – Full Business Case.* (BHRH, London).

Barlow J. and M. Koberle-Gaiser (2009), 'Delivering innovation in hospital construction: Contracts and collaboration in the UK's PFI hospitals program', *California Management Review*, Vol. 51, pp. 126-143.

Barnet & Chase Farm Hospital NHS Trust (1999), *Barnet Hospital PFI Scheme – Full Business Case.* (Barnet & Chase Farm Hospitals NHS Trust, London).

Bartelsman, E. J. Haltiwanger. S. Scarpetta (2005), 'Measuring and analyzing cross-country differences in firm dynamics', Paper prepared for the *NBER Conference on Research in Income and Wealth*.

Barts and the London NHS Trust (2006), *New hospitals programme – full business case.* (Barts and the London NHS Trust, London).

Baumol, W. J. Panzar and R. Willig (1982). *Contestable Markets and the Theory of Industry Structure*. (Harcourt Brace Jovanovich).

Benitez, D. and A. Estache (2005), 'How Concentrated are Global Infrastructure Markets?', World Bank Policy Research Working Paper 3513, February (World Bank, Washington, D.C).

Berkshire Healthcare NHS Trust (2001), *Prospect Park Mental Health - Full Business Case.* (Berkshire Healthcare NHS Trust, Bracknell).

Besley, T. and M. Ghatak (2003), 'Incentives, choice, and accountability in the provision of public services', *Oxford Review of Economic Policy*, Vol. 19, No. 2, pp. 235-249.

Blanc-Brude, F. and R. Strange (2007), 'How banks price loans to public private partnerships: Evidence from the European markets', *Journal of Applied Corporate Finance,* Vol. 19, No. 4, pp. 94-106.

Blanc-Brude, F. and O. Jensen (2010), *Competing for Public Procurement Risk: Evidence from PFI Schools Contracts in the UK.* Infrastructure Economics, London.

Brealey, R. I. Cooper. M. Habib (1997), 'Investment Appraisal in the Public Sector'. *Oxford Review of Economic Policy,* Vol. 13 (4), pp. 12-28.

Brealey, R., S Myers, and F. Allen (2008), *Principles of Corporate Finance* (McGraw-Hill, New York).

Brent Primary Care Trust (2002), *The Willesdon PFI Project – Full Business Case.* (Brent PCT, London).

Brighton Health Care NHS Trust (2004), *Full Business Case.* (Brighton Health Care NHS Trust, Brighton).

Broadbent, J. and R. Laughlin (2005), 'The role of PFI in the UK government's modernisation agenda', *Financial Accountability and Management*, 21 (1), 75–97.

Bromley Healthcare NHS Trust (1998), *Redevelopment of the Princess Royal University Hospital - Full Business Case.* (Bromley Healthcare NHS Trust, London).

Bro Morgannwg NHS Trust (2000), *Neath Port Talbot Hospital PFI Project - Full Business Case.* (Bro Morgannwg NHS Trust, Port Talbot).

Brown, G (2003), Speech given to the annual dinner of the Confederation of British Industry. Available at: europa.eu.int/constitution. [Accessed 30 September 2010]

Brown, G. R. Cook. and J. Prescott (1994), *Financing infrastructure investment: promoting a partnership between public and private finance*, *Joint Consultative Paper prepared for the Labour Finance and Industry Group Symposium on Public/Private Finance*. (The Labour Party, London).

Buckinghamshire Hospitals NHS Trust (1997), *Acute Services Redevelopment - Full Business Case.* (Buckinghamshire Hospitals NHS Trust, Buckingham).

Buckinghamshire Hospitals NHS Trust (2004), *Stoke Mandeville Hospital - Full Business Case.* (Buckinghamshire Hospitals NHS Trust, Buckingham).

Bulow, J. and Klemperer, P (1996), ‘Auctions versus Negotiations.’ *American Economic Review.* Vol. 86, pp. 180-194.

Buse and Harmer (2007), ‘Seven Habits of Highly Effective Global Public-Private Health Partnerships: Practice and Potential’, *Social Science and Medicine*, Vol. 64(2), 259–271.

Calderdale Healthcare NHS Trust (1998), *Redevelopment of Healthcare Services - Full Business Case*. (Calderdale Healthcare NHS Trust, Halifax).

Cambridge University Hospital NHS Foundation Trust (2004), *Elective Care, Diabetes and Genetics Centre – Full Business Case.* (Cambridge University Hospital NHS Trust, Cambridge).

Cardiff and Vale NHS Trust (2000), *St David's Community Hospital PFI Project - Full Business Case.* (Cardiff and Vale NHS Trust, Cardiff).

Carlisle Hospitals NHS Trust (1997), *Full Business Case for the Cumberland Infirmary Redevelopment.* (Carlisle Hospitals NHS Trust, Carlisle).

Carillo, P (2006), ‘A Knowledge Transfer Framework : the PFI context’. *Construction Management and Economics*, Vol. 24, No. 10, pp. 1045-1056.

CEPA (Cambridge Economic Policy Associates) (2005), *Public Private Partnerships in Scotland: Evaluation of Performance.* (Cambridge Economic Policy Associates, London).

Central Manchester Healthcare/Manchester Childrens NHS Trusts (2004), *Batched Procurement PFI Project – Full Business Case.* (NWSHA, Manchester).

Chamberlin, E (1958), *The theory of monopolistic competition: A re-orientation of the theory value*. (Harvard University Press, Massachusetts).

Chancellor of the Exchequer *et al* (1996), *A New Partnership in Old Age*, CM 3242 (London: The Stationery Office).

Chancellor of the Exchequer (2011), *Written Ministerial Statement: The Private Finance Initiative.* (The Stationery Office, London). Available at: http://www.hm-treasury.gov.uk/d/iuk_pfi_wms_151111.pdf

Chiang, Y. E. Chiang and P. Lam (2010), ‘Employing the Net Present Value-Consistent IRR Methods for PFI Contracts’. *Journal of Construction, Engineering and Management.* Vol. 136, pp. 180-184.

Clark, T. M. Elsby and S. Love (2001), *Twenty-five Years of Falling Investment? Trends in Capital Spending on Public Services*. (Institute for Fiscal Studies, London).

Coates, P (2005), *Changes to the SOC and OBC approval process for major capital schemes.* (Department of Health, London).

Commercial Secretary to the Treasury (2011), *Speech by the Commercial Secretary to the Treasury, Lord Sassoon, to the UKTI & Canadian Council for Public-Private Partnerships Roundtable on Exporting Public-Private Partnerships Expertise to Global Markets.* Available at: http://www.hm-treasury.gov.uk/speech_comsec_200911.htm [Accessed 06 December 2011]

Competition Commission (2003), *Market Investigation References: Competition Commission Guidelines.* (Competition Commission, London).

Cooper, Z. S. Gibbons. S. Jones and A. McGuire (2010), *Does hospital competition improve efficiency? An analysis of the recent market-based reforms to the English NHS. CEP discussion papers, No. 988.* (Centre for Economic Performance, London School of Economics and Political Science, London)

Copeland, T, F. Weston, K. Shastri (2005), *Financial Theory and Corporate Policy* (Addison-Wesley, London).

Cortes, B (1998). 'Trends in Industrial Concentration in Japan, 1983-92'. *International Review of Applied Economics.* Vol. 12, pp. 271-281.

Craig, D (2006), *Plundering the public sector.* (Constable, London).

Culyer, A (1998), 'Need - is a consensus possible?' *Journal of Medical Ethics*, Vol. 24, pp. 77-80.

Currie, D (2000), *Funding the London Underground*, Regulation Initiative Discussion Paper 35. (London Business School, London).

Curry, B. and K. George (1983), 'Industrial Concentration: A Survey', Journal of Industrial Economics, Vol. 31 (3), pp. 203-55.

Cuthbert J (2007), *The Fundamental Flaw in PFI? The Implications of Inappropriate Indexation of That Element of the Unitary Charge Covering Capital Finance Costs*. Available at: www.cuthbert1.pwp.blueyonder.co.uk [Accessed 01 April 2011]

Cuthbert, J. and M. Cuthbert (2008), *The implications of evidence released through freedom of information on the projected returns from the new Royal Infirmary of Edinburgh and* *certain other PFI schemes*. Memorandum to the Scottish Parliament Finance Committee.

Cuthbert, M. and J. Cuthbert (2010), 'The Royal Infirmary of Edinburgh – A Case Study on the Workings of the Private Finance Initiative', *Public Money and Management*, Vol. 30 (6), pp. 371–378.

Dahl, R (1964), *Modern political analysis*, (Prentice Hall, New Jersey).

Damoradan, A (2009), *Equity Risk Premiums (ERP): Determinants, Estimation and Implications - A post-crisis Update.* 22 November. Available at: http://ssrn.com/abstract=1492717 [Accessed 10 September 2010]

Dartford & Gravesham NHS Trust (1997), *Darent Valley Hospital - Full Business Case,* (Dartford & Gravesham NHS Trust, Dartford).

Debt Management Office (2010), *Historical Average Daily Conventional Gilt Yields.* Available at: http://www.dmo.gov.uk/rpt_parameters.aspx?rptCode=D4H&page=Conven_Gilts [Accessed 10 September 2010]

Department of Health (2008), *Treasury's Value for Money Assessment for PFI: Guidance for NHS New Build Schemes*. (Department of Health, London).

Department of Health (2009), *Freedom of Information Response*. Received by author 06 April 2009. Department of Health reference number: DE00000396114.

_______ (2010), *Prioritised Capital Schemes approved to go ahead since May 1997 (England).* (The Stationery Office, London).

_______ (2011), *The Operating Framework for the NHS in 2011/12.* Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_122738. [Accessed 01 April 2011]

Dimson, E. P. Marsh and M. Staunton (2002), *Triumph of the optimists: 101 years of global investment returns*. (Princeton University Press, Princeton).

DLA Piper (2008), *European PPP Report.* DLA Piper, London.

Donaldson, T (1989), *Credit Risk and Exposure in Securitization and Transactions*, (St. Martins Press, New York).

Dorrell, S (1993), *Private sector finance in the public sector*, Keynote address to the conference Improving Patient Services Using Private Sector Finance, Queen Elizabeth II Conference Centre, 9 June (London: Environmental and Medical Products Ltd)

Dowd, K (1998). *Beyond value at risk* (J Wiley, Chichester).

Dowdeswell, B. B. Rechel. S. Wright. J. Erskine. and M. McKee (2009), 'Introduction', In: B. Rechel. J. Erskine. B. Dowdeswell. S. Wright. and M. McKee (eds.) *Capital Investment for Health: Case Studies from Europe.* European Observatory on Health Systems and Policies, Copenhagen.

Dudkin, G. and T. Välilä (2005), 'Transaction costs in public-private partnerships: a first look at the evidence", *EIB Economic and Financial Report 2005/03* (European Investment Bank, Luxemburg).

Dudley Group of Hospitals NHS Trust (2001), *Full Business Case.* (Dudley Group of Hospitals NHS Trust, Dudley).

Dundee Healthcare NHS Trust (1999), *84-bed acute psychiatry unit – Full Business Case.* (Dundee Healthcare NHS Trust, Dundee).

East Lancashire Hospitals NHS Trust (2003a), *Redeveloping and Modernising the Royal Blackburn Hospital - Full Business Case.* (East Lancashire Hospitals NHS Trust, Blackburn).

East Lancashire Hospitals NHS Trust (2003b), *The Burnley Hospital PFI Project - Full Business Case.* (East Lancashire Hospitals NHS Trust, Burnley).

East London and the City Mental Health NHS Trust (2004), *Tier 4 Child and Adolescent Mental Health Services – Full Business Case.* (East London and the City Mental Health NHS Trust, London).

econ (2004), *Assessing the impact of public sector procurement on competition.* (Office of Fair Trading, London).

Edwards P. J. Shaoul. A. Stafford and L. Arblaster (2004), *Evaluating the Operation of PFI in Roads and Hospitals*. Research Report No. 84. (Association of Chartered Certified Accountants, London).

Emerson, R (1962), 'Power-dependence relations', *American Sociological Review*, vol. 27, pp. 31-41.

European Commission (2002), *Antitrust and control of concentrations.* (European Commission, Brussels).

_______ (2009), *Mobilising private and public investment for recovery and long-term structural change: developing PPPs. (*European Commission, Brussels).

_______ (2011), *A pilot for Europe 2020 Project Bond Initiative - legislative proposal adopted by the Commission.* (European Commission, Brussels).

(EPEC) European Public-Private-Partnerships Expertise Centre (2010), *Market Update: Review of the European PPP Market in 2010.* Available at: *http://www.eib.org/epec* [Accessed 01 April 2011]

(EPEC) European Public-Private-Partnerships Expertise Centre (2011a), *How is EPEC funded?* Web page. Available at: http://www.eib.org/epec/about/funding/index.htm [Accessed 01 December 2011]

(EPEC) European Public-Private-Partnerships Expertise Centre (2011b), *Risk Distribution and Balance Sheet Treatment: Practical Guide.* Available at: http://www.eib.org/epec/ [Accessed 06 December 2011]

European Parliament and the Council of the European Union (2009), 'Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (recast)'. *Official Journal of the European Union.* Available at: http://eur-lex.europa.eu [Accessed: 06 December 2011)

Fama, E. and K.French (1992), 'The Cross Section of Expected Stock Returns', *Journal of Finance,* Vol. 47, pp. 427-465.

Fabozzi, F. and P. Peterson (2003), *Financial Management and Analysis*. (Wiley Finance, London). Second Edition.

Flyvbjerg, B. M. Holm and S. Buhl (2002), 'Underestimating costs in public works projects: error or lie?', *Journal of the American Planning Association*, 68 (3), 279–95.

Froud, J. and J. Shaoul (2001), 'Appraising and evaluating PFI for NHS hospitals', *Financial Accountability and Management*. Vol. 17, No. 3, pp. 247-70.

Gaffney, D, A. Pollock, M. Dunnigan, J. Shaoul (1999), 'PFI in the NHS: is there an economic case?' *British Medical Journal*; 319: 10 July, pp. 4116-19.

Gatti, S (2007), *Project Finance in Theory and Practice,* Academic Press-Elsevier, Burlington).

Gaynor, M. C. Propper and R. Moreno-Serra (2010), *Death by Market Power: Reform, Competition and Patient Outcomes in the National Health Service*. CMPO Working Paper Series No. 10/242. Available at: http://www.bris.ac.uk/cmpo/publications/papers/2010/wp242.pdf. [Accessed 01 April 2011]

Geroski, P (1991), *Market Dynamics and Entry*, (Basil Blackwell, Oxford).

The Global Health Group (2009). *Public-Private Investment Partnerships: An innovative approach for improving access, quality and equity in healthcare in developing countries.* The Global Health Group, Univ. of California, San Francisco.

Goddard, J. P Molyneux and J. Wilson (2001), 'European Banking. Efficiency, Technology and Growth', (John Wiley and Sons, England).

Gómez-Lobo, A. and S. Szymanski (2001), 'A law of large numbers: bidding and compulsory competitive tendering for refuse collection contracts'. *Review of Industrial Organisation*, Vol.18, pp. 105–13.

Gosling, T (2003), *3 Steps Forward, 2 Steps Back: Reforming PPP Policy*, London: IPPR.

Graham, J. and C. Harvey (2002), 'The theory and practice of corporate finance: Evidence from the field'. *Journal of Financial Economics*, Vol. 60, pp. 60-78.

Greenaway, J. B. Salter and S. Hart (2004), 'The evolution of a "meta- policy": the case of the Private Finance Initiative and the health sector', *The British Journal of Politics and International Relations*, 6 (4), 507–26.

Green, P (2010), *Efficiency Review.* (Cabinet Office, London). Available at: http://www.cabinetoffice.gov.uk/sites/default/files/resources/sirphilipgreenreview.pdf [Accessed 01 April 2011]

Greer, S (2008), 'How the NHS is diverging in the UK's four nations,' *BMJ* 337: a2616

Grimsey, D. and M. Lewis (2004), *Public private partnerships – the worldwide revolution in infrastructure provision and project finance*, (Edward Elgar, Cheltenham).

Grossman, S. and O. Hart (1986), 'The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Ownership.' *Journal of Political Economy.* Vol. 94, pp. 691-719.

Grout, P (1997), 'The economics of the private finance initiative.' *Oxford Review of Economic Policy*. Vol. 13 (4): 53-66.

Grout, P (2005), 'Value-for-money measurement in public-private partnerships', *EIB Papers*, Vol. 10, No. 2. (European Investment Bank, Luxembourg).

The Guardian (2002), 'Unions call for an end to PFI deals', *The Guardian*, 11 September, p.3.

Gupta, S (2001), 'The Effect of Bid Rigging on Prices: A Study of the Highway Construction Industry', *Review of Industrial Organization*, 19, pp. 453-467.

Gupta, S (2002), 'Competition and Collusion in Government Procurement Auction Market', *Atlantic Economic Journal,* 30, pp.13-25.

Gwent Healthcare NHS Trust (1998), *Chepstow Community Hospital - Full Business Case.* (Gwent Healthcare NHS Trust, Gwent).

Hall, D (2008), *Public private Partnerships: Summary Paper*, (European Federation of Public Service Unions, Brussels).

Hampshire PCT (2004), *Lymington PFI Project – Full Business Case.* (Hampshire PCT, Winchester).

Hampton, J (1993), *Essentials of Risk Management and Insurance*. (AMACOM, New York).

Hannah, L. and J. Kay (1977), *Concentration in Modern Industry.* (Macmillan, London).

Hart, O, A. Shleifer, and R. Vishny (1997), 'The Proper Scope of Government: Theory and an Application to Prisons', *Quarterly Journal of Economics,* Vol. 112 (4), pp.1127-1161.

Hart, O (2003) 'Incomplete Contracts and Public Ownership: Remarks, and an Application to Public–Private Partnerships', *Economic Journal*, 113, March, C69–C76.

Heald, D (1997), 'Privately financed capital in public services', *Manchester School*. Vol. 65, No. 5, pp. 568-98.

Heald, D (2008), *The implications of the delayed switch to IFRS*. Memorandum to the House of Commons Treasury Select Committee. Available at: http://www.davidheald.com/publications.htm. [Accessed 01 April 2011]

Health and Social Care Bill [recommitted] (2011), (Her Majesty's Stationery Office, London).

Healthcare Commission (2005), 'Acute hospital portfolio reviews'. (Unpublished).

Health Select Committee (2002), 'The role of the private sector in the NHS'. (The Stationery Office, London).

Hellowell, M (2007), *Written evidence to the Finance Committee of the Scottish Parliament with regards to its inquiry into the funding of capital investment,* University of Edinburgh.

Hellowell, M. and V. Vecchi (2009), 'The cost-efficiency of private finance in public healthcare: evidence from the UK and Italy', *Mecosan Review*. (CERGAS, Milan).

Hellowell, M and A. Pollock (2009a). 'The private financing of NHS hospitals - politics, policy and practice'. *Economic Affairs*. Vol. 29, No. 1, pp. 13-21.

_______ (2009b). 'Do PPPs in Social Infrastructure Enhance the Public Interest? Evidence from England's National Health Service'. *Australian Journal of Public Administration*, 69 (S1): S23–S34.

_______ (2009c). 'Non-profit distribution: the Scottish approach to private finance in public services', *Social Policy* and *Society*, 8 (3), 405–14.

Hellowell, M (2010), 'The UK's private finance initiative: history, evaluation, prospects'. In Hodge *et al* (eds.) *The International Handbook on Public Private Partnerships*. (Edward-Elgar, London).

_______ (2011a), 'Box 1: Private finance comparison with public finance – worked example'. In Treasury Select Committee (2011), *Private Finance Initiative*. (The Stationery Office, London).

_______ (2011b), 'NHS cuts and PFI', *BMJ*; 343; d6681.

_______and Vecchi, V (2012), 'An evaluation of the projected returns to investors on 10 PFI projects commissioned by the National Health Service', *Financial Accountability and Management,* Vol.28, No.1, pp. 77-100.

Helm, D (2009), 'Infrastructure Investment, the cost of capital, and regulation: an assessment', *Oxford Review of Economic Policy,* Vol. 25 (1), pp. 307-326.

Hendricks, K. and Paarsch, H (1995), 'A survey of recent empirical work concerning auctions'. Canadian *Journal of Economics*, Vol. 28, (2), pp. 403–26.

Hereford Hospitals NHS Trust (1999), *Hereford County Hospital - Full Business Case.* (Hereford Hospitals NHS Trust, Hereford).

HICL (HSBC Infrastructure Company Limited) (2009), *Annual Report & Consolidated Financial Statements.* (HSBC Specialist Fund Management Ltd, London).

_______ (2010), *HICL's management and governance & A Case Study – Queen Alexandra Hospital.* (HSBC Specialist Fund Management Ltd, London).

Hillier, D, Ross, S, Westerfield, R, Jaffe, J, Jordan B (2010), *Corporate Finance: European Edition.* (McGraw-Hill, Maidenhead).

Hirshleifer, J (1958), 'On the theory of optimal investment decision', *Journal of Political Economy*, Vol.66, pp. 329-52.

_______ (1965), 'Investment Decision under Uncertainty: Choice-Theoretic Approaches,' *Quarterly Journal of Economics,* Vol.79*,* pp. 509-36.

_______ (1966), 'Investment Decision under Uncertainty: Applications of the State-Preference Approach,' *Quarterly Journal of Economics,* Vol.80, pp. 252-77.

HM Treasury (1996a), *Guidelines for Smoothing the Procurement Process* (London: HM Treasury).

_______ (1996b), *Writing an Output Specification* (London: HM Treasury).

_______ (1996c), *Basic Contractual Forms* (London: HM Treasury).

_______ (1997), *Further Contractual Issues* (London: HM Treasury).

_______ (2000), *Public Private Partnerships: The Government's Approach. Available at:* http://archive.treasury.gov.uk/docs/2000/ppp.html. [Accessed 01 April 2011]

_______ (2003b), *The Green Book: Appraisal and Evaluation in Central Government.* Available at: http://www.hm-treasury.gov.uk/d/green_book_complete.pdf. [Accessed 01 April 2011]

_______ (2003b), *PFI: Meeting the Investment Challenge.* Available at: http://webarchive.nationalarchives.gov.uk/20100407010852/http://www.hm-treasury.gov.uk/pfi.htm. [Accessed 01 April 2011]

_______ (2006), *Interest rate and inflation risks in PFI contracts.* http://www.hm-treasury.gov.uk/d/pfi_hedging120506.pdf [Accessed 01 April 2011]

_______ (2007a), *The use of Internal Rates of Return in PFI contracts.* Available at: http://www.hm-treasury.gov.uk/ppp_finance_guidance.htm. [Accessed 01 April 2011]

_______ (2007b), *Quantitative Assessment User Guidance: User Guide*. Available at: http://www.hm-treasury.gov.uk/ppp_vfm_index.htm. [Accessed 01 April 2011]

_______ (2007c). *Standardisation of PFI contracts*. *Version 4.* Available at: http://www.hm-treasury.gov.uk/ppp_standardised_contracts.htm. [Accessed 01 April 2011]

_______ (2009). *Standardisation of PFI contracts*. *Version 4 (updated).* Available at: http://www.hm-treasury.gov.uk/ppp_standardised_contracts.htm. [Accessed 06 December 2011]

_______ (2010a), *Public Private Partnerships – Technical Update 2010*. Available at: http://www.hm-treasury.gov.uk/d/ppp_technical_update.pdf. [Accessed 01 April 2011]

_______ (2010b), *Action to tackle poor value for money and unfunded spending commitments.* Available at: http://www.hm-treasury.gov.uk/press_13_10.htm. [Accessed 01 April 2011]

_______ (2010c), *Budget statement by the Chancellor of the Exchequer, the Rt Hon George Osborne MP.* Available at: http://www.hm-treasury.gov.uk/junebudget_speech.htm. [Accessed 01 April 2011]

_______ (2010d), *Infrastructure and complex procurement: emerging views and proposals. Freedom of Information response* [Ref: 10/290]. (Unpublished).

_______ (2010e), *HM Treasury Review of Competitive Dialogue.* http://www.hm-treasury.gov.uk/d/ppp_competitive_dialogue.pdf. [Accessed 01 April 2011]

_______ (2011a), *PFI Signed Projects List – March 2011*. Available at: http://www.hm-treasury.gov.uk/d/pfi_signed_projects_list_march2011.xls. [Accessed 01 April 2011]

_______ (2011b), *PFI Projects in procurement List – March 2011*. http://www.hm-treasury.gov.uk/d/pfi_projects_in_procurement_march2011.xls. [Accessed 01 April 2011]

_______ (2011c), *Making savings in operational PFI contracts - draft. http://www.hm-treasury.gov.uk/d/iuk_making_savings.pdf.* [Accessed 01 April 2011]

_______ (2011d), *Budget 2011: a strong and stable economy, growth and fairness.* Available at: http://www.hm-treasury.gov.uk/2011budget.htm. [Accessed 01 April 2011]

_______ (2011e), *Freedom of Information response: Ref: 11/156*. HM Treasury, London. (Unpublished: received on 11/03/2011).

_______ (2011f), *National Infrastructure Plan 2011.* Available at: http://www.hm-treasury.gov.uk/national_infrastructure_plan2011.htm [Accessed 06 December 2011]

Hodge, G. and D. Bowman (2006), ‘The 'consultocracy': the business of reforming government’. In Hodge, G. (ed.), *Privatization and market development*, (Edward Elgar, Cheltenham).

Hodge, G (2010), ‘Reviewing public-private partnerships: some thoughts on evaluation’, In, Hodge, G, C. Greve, and A. Boardman (eds), *International Handbook on Public-Private Partnerships.* (Edward Elgar, Cheltenham).

Holden, C (2009), ‘Exporting public-private partnerships in healthcare: export strategy and policy transfer’, *Policy Studies,* Vol. 30 (3), pp. 313-332.

Hollingsworth, B (2008), ‘The measurement of efficiency and productivity of health care delivery’, Health Economics, Vol. 17, pp. 1107-1128.

Hull & East Yorkshire (2000a). *Hull Royal Infirmary – maternity and acute development: base case financial model.* Accessed through a Freedom of Information response (no reference provided), November 2008.

Hull & East Yorkshire Hospitals NHS Trust (2000b), *New Maternity and Acute Facilities - Full Business Case.* (Hull & East Yorkshire Hospitals NHS Trust, Hull).

Hull & East Yorkshire Hospitals NHS Trust (2006), *Oncology Wing Redevelopment – Full Business Case.* (Hull & East Yorkshire Hospitals NHS Trust, Hull).

Hull & East Yorkshire (2006). *Hull Oncology – Scenario 8; 1st Base Case.* Accessed through a Freedom of Information response (no reference provided), August 2010.

Hurley, J (2001), ‘Ethics, economics, and public financing of health care’**,** *Journal of Medical Ethics,* Vol.27; pp. 234-239.

ICO (Information Commissioner’s Office) (2010), *Decision Notice issued under section 50(1) of the Freedom of Information Act 2000 – The Mid Yorkshire Hospitals NHS Trust.* (Information Commissioner’s Office, London). (Unpublished)

Independent Commission on Banking (2011), *Final Report: Recommendations*. Available at: http://bankingcommission.s3.amazonaws.com/wp-content/uploads/2010/07/ICB-Final-Report.pdf [Accessed 06 December 2011]

International Finance Corporation (2011), ‘Key trends in the evolution of PPPs’, *Handshake: IFC’s quarterly journal on public-private partnerships,* Issue 3, pp. 18-19.

International Labour Organization (2008), *Social health protection: an ILO strategy towards universal access to health care*. (International Labour Organization, Geneva).

International Public Partnerships (2010), *International Public Partnerships: Key statistics as at 31 March 2010*. (International Public Partnerships, London). Available at: http://www.internationalpublicpartnerships.com/pdf/Flyer%20-%20April%202010.pdf. [Accessed 01 April 2011]

IPPR (2001), *Building Better Partnerships: The final report of the commission on public private partnerships,* (IPPR, London).

Ipswich Hospital NHS Trust (2006), *Ipswich Hospital Redevelopment PFI Project – Full Business Case.* (Ipswich Hospital NHS Trust, Ipswich).

John Laing plc (2005), *Annual Report and Accounts 2005.* (John Laing plc, London).

_______ (2011), *Financial dynamics.* (John Laing, London). Available at: http://www.laing.com/top/industry_information/financial_aspects/financial_dynamics.html. [Accessed 01 April 2011]

Jeong, K. and R. Masson (1991), 'Entry during explosive growth: Korea during take-off'. In: Geroski. P. and J. Schwalbach (eds.) *Entry and market contestability: An international comparison*. (Basil Blackwell, Oxford).

Kay, J (1976). "Accountants, Too, Could be Happy in a Golden Age: The Accountants Rate of Profit and the Internal Rate of Return" *Oxford Economic Papers 28* (November): pp. 447-60.

Kay, J (2009), *The Long and the Short of It*, (The Erasmus Press, London).

King's Fund (2011), *Where next for the NHS reforms: The case for integrated care*, London: The King's Fund.

King's Healthcare NHS Trust (1999), *King's College Hospital - Full Business Case.* (King's Healthcare NHS Trust, London).

Kingston Hospital NHS Trust (2004), *Kingston Hospital Phase 5 PFI – Full Business Case.* (Kingston Hospital NHS Trust, London).

Kirkup, J (2009a), 'George Osborne says Conservatives would replace PFI', *The Telegraph*, 15 November, p.3.

_______ (2011), 'Force firms to repay ghastly PFI profits, says minister', *The Telegraph*, 29 January, p.3.

Klein, M (1997), 'The risk premium for evaluating public projects', *Oxford Review of Economic Policy*, 13 (4), 29–42.

Klemperer, P (1999), 'Auction theory: a guide to the literature'. *Journal of Economic Surveys*, Vol. 13 (3), pp. 227–86.

Koch, T and S. MacDonald (2010), *Bank Management,* 7th Edition, (Thomson South-Western, Mason, Ohio, USA).

KPMG (2009), *The use of mini-perms in UK PFI: Passing fad or here to stay?* (KPMG LLP, London).

Krugman, P and Wells, R (2009), Macroeconomics. 2nd Edition. (Worth Publishers, United States).

Kutzin, J (2008), *Health Financing Policy: A Guide for Decision-Makers.* (World Health Organization, Barcelona).

Kwoka, J (1979), 'The Effect of Market Share Distribution on Industry Performance', *Review of Economics and Statistics,* Vol. 61, pp. 101-109.

Kwoka, J (1985), 'The Herfindahl index in theory and practice', *The Antitrust Bulletin,* Winter, pp. 915-948.

Labour Party (1997), *Manifesto 1997: New Labour because Britain deserves better.* (The Labour Party, London).

Laffront, J (1997), 'Game theory and empirical economics: the case of auction data'. *European Economic Review*, Vol. 41, pp. 1–35.

Lanarkshire Acute Hospitals NHS Trust (1998a), *Hairmyres Hospital: Part 1C of PFI Contract: Ernst & Young Base Case Financial Model.* Accessed through a Freedom of Information response (no reference provided), November 2008.

_______ (1998b), *Law hospital (Wishaw): Base Case Financial Model*. Accessed through a Freedom of Information response (no reference provided), June 2009.

Lanarkshire Acute Hospitals NHS Trust (1998c), *Hairmyres Hospital PFI Project – Full Business Case.* (Lanarkshire Acute Hospitals NHS Trust, Wishaw).

Lanarkshire Acute Hospitals NHS Trust (1998d), *Law Hospital PFI Project (Wishaw) – Full Business Case.* (Lanarkshire Acute Hospitals NHS Trust, Wishaw).

Langenbrunner, J. C. Cashin. S. O'Dougherty (2009), *Designing and Implementing Health Care Provider Payment Systems.* The World Bank, Washington D.C.

Leathley, A (1994), 'Smith out to steal a march on the Tories', *The Times*, 21 February, p. 3.

Leeds Teaching Hospitals NHS Trust (2002), *The Wharfedale Project - Full Business Case.* (Leeds Teaching Hospitals NHS Trust, Leeds).

Leeds Teaching Hospitals NHS Trust (2004), *St James Hospital PFI project - Full Business Case.* (Leeds Teaching Hospitals NHS Trust, Leeds).

Le Grand, J (2009), 'Choice and competition in publicly funded health care'. *Health economics, policy and law*, 4 (4). pp. 479-488.

Lewisham Hospital NHS Trust (2004), *Redevelopment of Lewisham Hospital – Full Business Case.* (Lewisham Hospital NHS Trust, London).

Lintner, J. (1965), "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," *Review of Economics and Statistics*, No. 47, pp. 226-37.

Lipczinski, J. J. Wilson and J. Goddard (2005), *Industrial Organization, Competition, Strategy, Policy*. (FT Prentice Hall, Harlow). Secodn edition.

Lonsdale, C (2005), 'Risk transfer and the UK Private Finance Initiative: a theoretical analysis', *Policy and Politics*, 2, 231–49.

Lonsdale, C. and G. Watson (2007), 'Managing Contracts under the Private Finance Initiative', *Policy and Politics*, Vol. 35, No. 4, pp. 683-700.

Lothian University Hospitals NHS Trust (1998), *New Royal Infirmary of Edinburgh: Model run of 18/08/09; vol.12.2, NRIE Bible of Documents*. Accessed through a Freedom of Information response (no reference provided), November 2008.

Lukes, S (1974), *Power: A radical view*, (Free Press, New York).

MacNeil, I (1981), 'Economic Analysis of Contractual Relations: Its Shortfalls and the Need for a Rich Classificatory Apparatus.' *Northwestern University Law Review*. Vol. 75, pp. 1018-1063.

Maidstone and Tunbridge Wells NHS Trust (2008), *Full Business Case.* (Maidstone and Tunbridge Wells NHS Trust, Maidstone).

Mann, H (1966), 'Seller Concentration, Barriers to Entry and Rates of Return in Thirty Industries, 1950-1960.' *Review of Economics and Statistics*, August, pp. 296-307.

Markowitz, H (1952), 'Portfolio Selection', *The Journal of Finance,* Vol. 7, No. 1, pp. 77-91.

Mason, E (1939), 'Price and production policies of large-scale enterprise', *American Economic Review*, Vol. 29, pp 61-74.

_______ (1949), 'The current state of the monopoly problem in the United States', *Harvard Law Review*, Vol. 62, pp 1265-1285.

Mason, A. A. Street. M. Miraldo. L. Siciliani (2009), 'Should prospective payments be differentiated for public and private healthcare providers', *Health Economics, Policy and Law,* 4: 383-403.

McAfee, R. and J. McMillan (1987), 'Auctions and bidding'. *Journal of Economic*s, Vol. 25, pp. 699-738.

McKinsey (2010), *Achieving World Class Productivity in the NHS 2009/10 – 2013/14: Detailing the Size of the Opportunity.* (Department of Health, London). Available at: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_116521.pdf. [Accessed 01 April 2011]

Mehra, R. and Prescott, E (1985), 'The Equity Premium: A Puzzle', *Journal of Monetary Economics.* Vol. 15, pp. 145-161.

Merton, R (1987), 'A Simple Model of Capital Market Equilibrium with Incomplete Information', *Journal of Finance*, Vol. 42, No. 3, pp. 483-510

Michelini, C. and M. Pickford (1985), 'Estimating the Herfindahl Index from concentration ratio data. *Journal of the American Statistical Association.* Vol. 80, pp. 301–305.

Mid Devon Primary Care Trust (2002), *Tiverton Capital Project – Full Business Case.* (Mid Devon PCT, Exeter)

Mid Essex Hospital Services NHS Trust (2007), *PFI Procurement – Centralisation and Modernisation of Acute Services at Broomfield. Full Business Case.* (Mid Essex Hospital Services NHS Trust, Broomfield).

Mid Essex Hospital Services NHS Trust (2007), *Full Business Case.* (Mid Essex Hospital Services NHS Trust, Chelmsford).

Mid-Yorkshire Hospitals NHS Trust (2007), *Hospitals Development Project – Full Business Case.* (The Mid-Yorkshire Hospitals NHS Trust, Wakefield).

Milgrom, P (1989), 'Auctions and bidding: a primer'. *Journal of Economic Perspectives*, Vol.3 (3), pp. 3-22.

Milne, R. and R. Wright (2004), 'Competition and costs: Evidence from competitive tendering in the Scottish National Health Service'. *Scottish Journal of Political Economy.* Vol. 51 (1), pp. 64-87.

Molyneux, P. and J. Thornton (1992), 'Determinants of European bank profitability: A note', *Journal of Banking and Finance,* Vol. 16 (6), pp. 1173-1178.

Moody's (2010), *Default and Recovery Rates for Project Finance Bank Loans, 1983-2008.* (Moody's Investors Services, London). Available at: http://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_123903. [Accessed 01 April 2011]

Mott MacDonald (2002), *Review of Large Public Procurement in the UK,* (HM Treasury, London).

National Audit Office (2001a), *The refinancing of the Fazakerley PFI prison contract*. London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2001b), *Innovation in PFI Financing: The Treasury Building Project*. London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2003), *PFI Construction Performance*. London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2005a), *The Refinancing of the Norfolk and Norwich PFI Hospital: how the deal can be viewed in the light of the refinancing.* London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2005b), *Improving public services through better construction.* London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2007a), *The operational record of the first wave of PFI hospitals*. (Unpublished).

_______ (2007b), *Improving the PFI tendering process*, (London, The Stationery Office). Available at: www.nao.org.uk/publications.[Accessed 01 April 2011]

_______(2007c), *Benchmarking and Market Testing the Ongoing Services Component of PFI Projects*. London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2009a), *Private finance projects: a paper for the House of Lords Economic Affairs Committee.* London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2009b), *Performance of PFI Construction.* London: The Stationery Office. Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2010a), *The performance and management of hospital PFI projects*. (The Stationery Office London). Available: www.nao.org.uk/publications [Accessed 01 April 2011]

_______ (2010b), *Freedom of Information response: PFI census data.* (Unpublished). Accessed through the Freedom of Information Act – Reference FOI-421.

_______ (2010c), *Financing PFI projects in the credit crisis and the Treasury's response.* (The Stationery Office London). Available: www.nao.org.uk/publications [Accessed 01 April 2011]

Nawrocki, D. and W. Carter (2009), 'Industry competitiveness using Herfindahl and entropy concentration indices with firm market capitalization data', *Applied Economics*, 09 April, pp. 1-9

Needham, D (1969), *Economic Analysis and Industrial Structure* (Holt, Rinehart and Winston, New York).

NERA (2004), *Empirical indicators for market investigations.* (Office of Fair Trading, London).

Newham Healthcare NHS Trust (2004), *Ambulatory Care and Diagnostic Centre and New Clinical Block at Newham General Hospital – Full Business Case.* (Newham Healthcare NHS Trust, London).

NHS Argyll and Clyde (2004), *The Modernisation and Re-design of Primary and Community Health and Social Care in Mid-Argyll - Full Business Case.* (NHS Argyll and Clyde, Argyll).

NHS Ayrshire & Arran (2004), *New Maternity Unit, Crosshouse Hospital - Full Business Case.* (NHS Ayrshire & Arran, Ayr).

NHS Ayrshire and Arran (2006), *Full Business Case for Girvan Community Hospital.* (NHS Ayrshire and Arran, Ayr).

NHS Fife (2007a), *St Andrews Community Hospital and Resource Centre - Full Business Case.* (NHS Fife, Dunfermline).

NHS Fife (2007b), *Larbert Hospital Redevelopment - Full Business Case.* (NHS Fife, Dunfermline).

NHS Forth Valley (2007a), *Health care strategy: acute hospital full business case.* (NHS Forth Valley, Stirling).

NHS Forth Valley (2007b), *Clackmannanshire Community Health Services Project – Full Business Case.* (NHS Forth Valley, Stirling).

NHS Forth Valley (2008), Letter to the author. (21 November 2008).

NHS Greater Glasgow and Clyde (2005a), *Stobhill Local Forensic Psychiatric Unit - Full Business Case.* (NHS Greater Glasgow and Clyde, Glasgow).

NHS Greater Glasgow and Clyde (2005b), *Gartnaval Royal Hospital - Full Business Case.* (NHS Greater Glasgow and Clyde, Glasgow).

NHS Greater Glasgow and Clyde (2006), *Full business case for Ambulatory Care and Diagnostic Centres.* (NHS Greater Glasgow and Clyde, Glasgow).

NHS Tayside (2003), *Replacement of Forfar Infirmary & Whitehills Hospital – Full Business Case.* (NHS Tayside, Dundee).

NHS Executive (1999), *Public Private Partnerships in the National Health Service: The Private Finance Initiative - Section 2: The PFI Procurement Process.* (NHS Executive, Leeds).

_______ (2002), *Improving PFI Procurement.* (NHS Executive, Leeds).

Nicholson, W (1983), *Efficiency and welfare. Intermediate microeconomics and its application*. (Dryden Press, New York).

NIESR (National Institute of Economic and Social Research) (2006), *Business start-ups, closures and economic churn: A review of the literature.* (Department for Business, Enterprise and Regulatory Reform, The Stationery Office, London).

Nolte, E and M. McKee (2011), *Does Healthcare Save Lives? Avoidable Mortality Revisited* (Nuffield Trust, London).

Nolte, E and M. McKee (2011), 'Variations in amenable mortality – trends in 16 high-income nations. *Health Policy.* Published online 12 September 2011. Available at:

www.lgbttobacco.org/files/nolte_trends%20in%2016%20high-income%20nations.pdf (Accessed 24 November 2011).

Norfolk and Norwich Healthcare Trust (1999), *Norfolk and Norwich University Hospital - Final business case.* (NNHT, Norwich).

Norfolk and Norwich University Hospitals NHS Trust (2001), *Octagon: Norfolk and Norwich Hospital – new base case model (version 60-Final).* Accessed through a Freedom of Information response (Ref: PE4228), April 2008.

Norman, J (2011), 'It is time to derail the PFI gravy train', *The Telegraph*, 18 January, p.18.

North Bristol NHS Trust (2009), *Southmead Hospital – Appointment Business Case and Appendices.* (North Bristol NHS Trust, Bristol).

North Cumbria University Hospitals NHS Trust (1998). *Cumberland Infirmary: Henry Schroeder and Co. Base Case Financial Model.* Accessed through a Freedom of Information response (Ref: 000337), July 2008.

Northamptonshire Teaching PCT (2005), *Daventry and South Northants PFI Project - Full Business Case.* (Northamptonshire Teaching PCT, Northampton).

Northgate and Prudhoe NHS Trust (2005), *Neuro Disability Centre - Full Business Case.* (Northgate and Prudhoe NHS Trust, Prudhoe).

Northern Ireland Executive (2011), *Draft Budget* 2011. (Northern Ireland Executive, Belfast).

North Kirklees Primary Care Trust (2004), *Development of Primary and Intermediate Care Facilities in North Kirklees – Full Business Case.* (North Kirklees PCT, Wakefield).

North Middlesex University Hospital NHS Trust (2007), *Full business case for the redevelopment of North Middlesex University Hospital: final version 4.* (NMUH, London).

Northumbria Healthcare (2000), *Wansbeck Hospital PFI Project - Full Business Case.* (Northumbria Healthcare, Morpeth).

Northumbria Healthcare (2001), *Hexham Hospital PFI - Full Business Case and Appendices Version 4.* (Northumbria Healthcare, Morpeth).

North Tees and Hartlepool NHS Foundation Trust (2010a), *New Hospital Capital Project: Outline Business Case.* (North Tees and Hartlepool NHS Foundation Trust, Hartlepool).

North Tees and Hartlepool NHS Foundation Trust (2010b), *New Hospital Development: Outline Business Case. Version 3.* (North Tees and Hartlepool NHS Foundation Trust, Hartlepool).

North West London Hospitals NHS Trust (2003), *The Central Middlesex PFI Project - Full Business Case.* (North West London Hospitals NHS Trust, London).

Nottingham University NHS Trust (1999a). *Queen's Medical Centre: KPMG base case financial model.* Accessed through a Freedom of Information response (Ref: NUH 174) November 2008.

Nottingham University Hospitals NHS Trust (1999b), *Queen's Medical Centre – Full Business Case.* (Nottingham University Hospitals NHS Trust, Nottingham).

O'Brien, C (2009), *The UK with-profits life insurance industry: a market review.* (Nottingham University Business School, Nottingham).

The Observer (1994), 'Labour's private cash bombshell', 20 February, p. 1.

OECD (2011), *Health at a glance 2011.* (OECD, Paris).

Office for Budget Responsibility (2011a), *What should we include in the fiscal sustainability report?* Office for Budget Responsibility, London. Available at: http://86.54.44.148/wordpress/docs/obr_discussion_paper_no1_230320111.pdf. [Accessed 01 April 2011]

Office for Budget Responsibility (2011b), Letter to Andrew Tyrie, Chairman of the Treasury Select Committee (October 2011).

Office of Fair Trading and Office of Government Commerce (2004), *Making competition work for you.* (The Stationery Office, London).

Office of Fair Trading (2009), *Merger Assessment Guidelines.* (Office of Fair Trading, London).

Office of Fair Trading and Competition Commission (2010), *Merger Assessment Guidelines*, 2010. (Office of Fair Trading, London). Available at: www.oft.gov.uk/shared_oft/mergers/642749/OFT1254.pdf [Accessed 01 April 2011]

Office of Government Commerce (2003), *Increasing Competition and Improving Long-Term Capacity Planning in the Government Market Place*, OGC Report to the Chancellor of the Exchequer.

Office of Government Commerce (2006), *Competitive Dialogue procedure: OGC guidance on the Competitive Dialogue Procedure in the Procurement Regulations.* Available at: http://www.ogc.gov.uk/documents/guide_competitive_dialogue.pdf. [Accessed 01 April 2011]

Office of National Statistics (2004), *Concentration ratios for businesses by industry in 2004*. (Office of National Statistics, London).

Office of National Statistics (2008), *Private finance initiative and public debt,* by Kalleway, M. Available at: http://www.statistics.gov.uk/ELMR/05_08/downloads/ELMR_May08_Kellaway.pdf [Accessed 22 December 2011]

Oxford Radcliffe Hospitals NHS Trust (2003), *Radcliffe Hospital PFI Project - Full Business Case.* (Oxford Radcliffe Hospitals NHS Trust, Oxford).

Oxford Radcliffe Hospitals NHS Trust (2005), *Churchill Hospital PFI Project - Full Business Case.* (Oxford Radcliffe Hospitals NHS Trust, Oxford).

Palmer, K (2006), *NHS Reform: Getting Back on Track*. (King's Fund, London).

_______ (2011), *Reconfiguring Hospital Services: Lessons from South East London*. (King's Fund, London).

Partnerships UK (2008), *Comments on the Paper "Fundamental flaw in PFI? by Jim Cuthbert.* (Partnerships UK, London). Available at: http://www.cuthbert1.pwp.blueyonder.co.uk/papers%202/Parnerships%20UK%20comments.doc. [Accessed 01 April 2011]

_______ (2010), *Projects Database*. (Partnerships UK, London). Available at: http://www.partnershipsuk.org.uk/PUK-Projects-Database.aspx. [Accessed 01 April 2011]

Pepall, L. D. Richards and G. Norman (2005), *Industrial Organization: Contemporary Theory & Empirical Applications*. (Blackwell Publishing, London). Third edition.

Peterborough & Stamford Hospitals NHS Foundation Trust (2007), *Full Business Case.* (Peterborough & Stamford Hospitals NHS Foundation Trust, Peterborough).

PFI Infrastructure Company plc (2004), *Prospectus: Placing and Admission to AIM.* (PFI Infrastructure Company plc, London). Available at: http://www.pfiplc.com/pdf/PFI_Infrastructure_prospectus.pdf. [Accessed 01 April 2011]

Pollitt, M (2002), ‘The Declining Role of the State in Infrastructure Investment in the UK’, in S. Berg. M. Pollitt and M. Tsuji (eds.) *Private Initiatives in Infrastructure: Priorities, Incentives and Performance*. (Edward Elgar, Aldershot).

Pollock, A, J. Shaoul, N. Vickers (2002). ‘Private finance and “value for money” in NHS hospitals: a policy in search of a rationale?’, *British Medical Journal*. 324: pp. 1205-9.

Pollock, A., D. Price and S. Player (2007) ‘An Examination of the UK Treasury’s Evidence Base for Cost and Time Overrun Data in UK Value-for-Money Policy and Appraisal’, *Public Money and Management*, 27, 2, 127–134.

Portsmouth Hospitals NHS Trust (2005), *Reconfiguration of Acute Services and Hospital Site Rationalisation - Full Business Case.* (Portsmouth Hospitals NHS Trust, Portsmouth).

Posnett, J. (2002) “Are bigger hospitals better?” in McKee, M. and J. Healy, (eds.) *Hospitals in a Changing Europe,* (Open University Press, Buckingham).

Preker, A. *et al* (2004), ‘Rich-poor differences in health care financing’. In: Preker A. and G. Carrin (eds.) *Health financing for poor people: resource mobilization and risk-sharing*. (The World Bank, Washington, DC).

Price, D. and J. Green (2000). ‘Capital Planning and the Private Finance Initiative: Cost Minimisation or Health Care Planning’, *Critical Public Health*, 10, 1, pp. 71–80.

Prior, N (2009), ‘Tories be bold’. *Partnerships Bulletin*. 7 April. London: Rockliffe Publishing. Available at: http://partnershipsbulletin.co.uk/features/view/891 (subscription only) [Accessed 10 July 2010]

Public Accounts Committee (2003), *PFI Construction Performance.* (The Stationery Office, London). Available at: http://www.publications.parliament.uk/pa/cm200203/cmselect/cmpubacc/567/567.pdf [Accessed 01 April 2011]

Public Accounts Committee (2011), *Lessons from PFI and other projects.* (The Stationery Office, London). Available at: http://www.publications.parliament.uk/pa/cm200203/cmselect/cmpubacc/567/567.pdf [Accessed 06 December 2011]

PricewaterhouseCoopers and J. Franks (2002), *Study into Rates of Return Bid on PFI Projects*, The Office of Government Commerce. (London, The Stationery Office).

PricewaterhouseCoopers (2005), *Queen Elizabeth Hospital NHS Trust: Public Interest Report*, (Audit Commission, London).

PricewaterhouseCoopers (2008). *Infrastructure finance - surviving the credit crunch*. (PricewaterhouseCoopers, London). Available at: http://www.pwc.co.uk/eng/publications/infrastructure_finance_surviving_the_credit_crunch.html. [Accessed 01 April 2011]

Propper, C., D. Wilson and S. Burgess (2006), 'Extending Choice in English Health Care: The Implications of the Economic Evidence'. *Journal of Social Policy,* 35**,** 537-557.

Public Account Committee (2010*), PFI in Housing and Hospitals. Report, together with formal minutes, oral and written evidence.* (The Stationery Office, London).

Queen Elizabeth Hospital NHS Trust (1998), *Greenwich Hospital PFI Project - Full Business Case.* (Queen Elizabeth Hospital NHS Trust, London).

Queen Mary's Hospital Sidcup NHS Trust (1998), *Mental Health Services – Full Business Case.* (Queen Mary's Hospital Sidcup NHS Trust, London).

Redcar and Cleveland Primary Care Trust (2008), *Redcar Community Hospital PFI – Full Confirming Business Case.* (Redcar and Cleveland Primary Care Trust, Redcar).

Reiss, A (2005), 'Is the PPP model applicable across sectors?', EIB Papers. Vol.10 (2), pp. 10-30. (European Investment Bank, Luxembourg).

Robertson, A (1998), 'Critical reflections on the politics of need: implications for public health'. *Social Science and Medicine*, Vol. 47, pp. 1419-30.

Robinson, N (2009). 'The European Investment Bank: The EU's Neglected Institution'. *Journal of Common Market Studies*, Vol. 47, No. 3, pp. 651-673.

Royal Infirmary of Edinburgh NHS Trust (1997), *The New Royal Infirmary of Edinburgh. Full Business Case.* (Royal Infirmary of Edinburgh NHS Trust, Edinburgh).

Royal Liverpool and Broadgreen University Hospital Trust (2010), *A New Health Service for Liverpool - World Class Hospitals, World Class Services (Volume 1) - Outline Business Case*. (Royal Liverpool and Broadgreen University Hospital Trust, Liverpool).

Royston, Buntingford & Bishop's Stortford Primary Care Trust (2001), *Full Business Case.* (Royston, Buntingford & Bishop's Stortford Primary Care Trust, Royston).

Royston, Buntingford and Bishop Stortford PCT (2002), *Essex Community Hospital: base case financial model.* Accessed through a Freedom of Information response, (no reference provided), May 2008.

Ruane, S (2010), 'Corporate and political strategy in relation to the Private Finance Initiative in the UK', *Critical Social Policy,* Vol. 30 (4), pp. 519-540.

Ryan, M. A. Jessop. S. Rafferty. P. Cleal. A. Methven. and B. Jacobson B (2006), 'Recycling PPPs: a Study of the UK Secondary Market.' *PPP In-Depth*. Issue 6, April/May. (City and Financial, London).

Salford Royal Hospitals NHS Trusts (2007), *Full Business Case.* Salford Royal Hospitals NHS Trusts, Salford.

Salisbury Health Care NHS Trust (2003), *Salisbury District Hospital Redevelopment Project – Full Business Case.* (Salisbury Health Care NHS Trust, Salisbury).

Salomons, R. and H. Grootveld (2003). 'The equity risk premium: emerging vs. developed markets'. *Emerging Markets Review*, Vol. 4 (2), pp. 121-134.

Sandwell & West Birmingham Hospitals (2002), *City Hospital PFI Project _ Full Business Case Version 3.* (Sandwell & West Birmingham Hospitals, Birmingham).

Samuelson, P. and W. Vickrey, 'Discussion', *American Economic Review*, Vol. 50, pp. 88-96.

Sandwell and West Birmingham Hospitals NHS Trust (2002). *Birmingham Ambulatory Care Centre: base case financial model.* Accessed through Freedom of Information (no reference provided), November 2008.

Scherer, F (1980), *Industrial market structure and economic performance.* (Rand McNally. Chicago).

Scherer, F (1982), 'Inter-Industry Technology Flows in the United States,' *Research Policy*, vol. 11, pp. 227-245.

Sclar, E (2000), *You don't always get what you pay for: The economics of privatization.* (Cornell University, New York).

Scottish Futures Trust (2011), *Revenue financed infrastructure investment in Scotland: £2.5 billion project pipeline information*. (Scottish Futures Trust, Edinburgh). Available at: http://www.scottishfuturestrust.org.uk/docs/297/%C2%A32.5billion%20Revenue%20Financed%20Project%20Pipeline%20Feb%202011.pdf. [Accessed 01 April 2011]

Scottish Government (2011), *Draft Budget 2011*. (Scottish Government, Edinburgh).

Singer, E (1968), *Antitrust Economics* (Englewood Cliffs, New Jersey)

Shaffer, S (1994), ‘Evidence of monopoly power among credit card banks’ Working Papers, 94-16/R, Federal Reserve Bank of Philadelphia.

Sharpe, W. F (1964), “Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance*, 19, pp. 4254-42.

Shaoul, J., A. Stafford and P. Stapleton (2007), ‘Partnerships and the role of financial advisors: private control over public policy?’, *Policy and Politics*, Vol. 35 (3), 479–95.

Shaoul, J, A. Stafford, P. Stapleton (2008), ‘The Cost of Using Private Finance to Build, Finance and Operate Hospitals’, *Public Money & Management*, Vol. 28, No 3, pp. 101-108.

Sheffield Teaching Hospitals NHS Foundation Trust (2004), *Extension and refurbishment of Northern General Hospital - Full Business Case*. (STH Foundation Trust, Sheffield).

Shepherd, W (1982), ‘Monopoly Profits and Economies of Scale,’ in Craven, J. (ed.), *Industrial Organization, Antitrust, and Public Policy*, (Kluwer Nijhof, Boston)

_______ (1997), *The Economics of Industrial Organization*. (Prentice-Hall, New Jersey) (Fourth edition).

_______ (2005), ‘The State of the Industrial Organization Field’, In *de Gijsel, P. and H. Schenk (eds.) Multidisciplinary Economics*, pp. 103-126.

Sherwood Forest Hospitals NHS Trust (2005), *Modernisation of acute services project.* (Sherwood Forest Hospitals NHS Trust, Nottingham).

Shleifer, A (1998), ‘State versus Private Ownership’, *Journal of Economic Perspectives*, Vol. 12 (4), pp. 133-150.

Shleifer, A and RW Vishny (1997), ‘The Limits of Arbitrage’, *The Journal of Finance*, Vol. LII, No.1, pp. 35-55.

Sleuwaegen L. and W. Dehandschutter (1986), ‘The critical choice between the concentration ratio and the h-index in assessing industry performance’, *Journal of Industrial Economics*, vol. 35 (2), pp. 193-208.

Smith, K. and Hellowell, M (2012), ‘Beyond Rhetorical Difference: A Cohesive Account of Post-Devolution Developments in UK Health Policy’, *Social Policy & Administration,* Vol.46, No.2 (in press).

Smith, M (2009), *Ensuring Value for Money in Infrastructure Projects: Financing a New Referral Hospital in Lesotho.* (Collaborative Africa Budget Reform Initiative, Johannesburg).

South Tees Acute Hospitals NHS Trust (1999), *Full Business Case - the James Cook University Hospital PFI Capital Project.* (South Tees Acute Hospitals NHS Trust, Middlesbrough).

Spackman, M (2001), *Risk and the cost of risk in the comparison on public and private financing of public services.* (National Economic Research Associates, London).

Sperrin Lakeland Health & Social Services Trust (2008), *Acute Hospital For The South West (Enniskillen) - Full Business Case.* (Sperrin Lakeland Health & Social Services Trust, Enniskillen*).*

St George's Hospital NHS Trust (2000), *New Cardiothoracic & Neurosciences Buildings - Full Business Case.* (St George's Hospital NHS Trust, London).

St Helen's and Knowsley Hospitals NHS Trust (2006), *Strategic Redevelopment Project (hospitals) – Full Business Case.* (St Helen's and Knowsley Hospitals NHS Trust, St Helen's).

Standard and Poor's (2006), *'Capital Hospitals PFI Debt Assigned 'AAA'(Ins)/'BBB-'(SPUR) Ratings; SPUR Outlook Stable'. Ratings Direct*, November. (Standard and Poor's, London).

Stewart, J (2009), *How New Procurement Approaches will Transform the Delivery of Public Services.* Speech to the Partnerships UK annual conference, 15 October 2009. (City and Financial, London).

Stewart, J (2009), *How New Procurement Approaches will Transform the Delivery of Public Services.* Speech to the Partnerships UK annual conference, 15 October 2009. (City and Financial, London).

Stigler, G (1964), 'A theory of oligopoly', *Journal of Political Economy*, Vol. 72 (February), pp. 44-61.

_______ (1968). *The organization of industry*. (Richard D. Irwin, Homewood).

Stiglitz, J (2000), *Economics of the Public Sector*. (Norton & Company, New York. Third edition.

Sussex, J (2001), *The Economics of the Private Finance Initiative in the NHS*, London: Office of Health Economics.

Sussex, J (2009), ‘How fair? Competition between independent and NHS providers to supply non-emergency hospital care to NHS patients in England’, *OHE Briefing.* (Office of Health Economics, London).

Sussex Partnership NHS Trust (1999), *The Redevelopment of Graylingwell Hospital – Full Business Case.* (Sussex Partnership NHS Trust, Worthing).

Sutton, J (1991), *Sunk Costs and Market Structure*. (MIT Press, Cambridge).

Swindon & Marlborough NHS Trust (1999), *Great Western Hospital - Full Business Case.* (Swindon & Marlborough NHS Trust, Swindon).

Szymanski, S (1996), ‘The Impact of Compulsory Competitive Tendering on Refuse Collection Services, *Fiscal Studies*, Vol. 17(3), pp. 1-19.

Talbot-Smith A., A. Pollock (2006). *The New NHS: a guide.* (Routledge, London).

Tameside Hospital NHS Foundation Trust (2006), *Health Investment in Tameside and Estates Capital Project – Full Business Case Version 3.* (Tameside Hospital NHS Foundation Trust, Ashton-under-Lyne).

The Telegraph (2002), *Unions change tactics on PFI*, The Telegraph, 29 September, p.4

Thiadens, J, R Kriek, G Afink, A Burger, N Oosterom (2009), ‘Martini Teaching Hospital, Groningen, Netherlands’, In Rechel, B, J Erskine, B Dowdeswell, S Wright and M McKee (eds) *Capital Investment for Health: Case Studies from Europe*. (WHO, Copenhagen).

Timmins, N. (2005), ‘Warning of ‘spurious’ figures on value of PFI’. *The Financial Times*, 5 June, p.3.

Timmins, N (2010), ‘Lansley U-turn over NHS price competition’, *The Financial Times*, 2 March, p.3.

Timmins, N (2011), ‘Union attacks Tories over PFI deals’, *The Financial Times*, 15 May, p.3.

Thompson, C. and M. McKee (2004), ‘Financing and Planning of Public and Private Not-For-Profit Hospitals in the European Union. *Health Policy*, Vol.67 (3): 281–291.

Thomson, S (2008), *Health Care Financing in the Context of Social Security.* Policy Department, Economic and Scientific Policy. (European Parliament, Brussels).

Thomson Datastream (2010), *International Public Partnerships: Historical Betas.* (Thomson Reuters, London).

ThomsonOneBanker (2009), *Project Finance listings*. Available at: http://OneBanker.com (subscription only) [Accessed 01 December 2009]

Thomson Reuters (2010), *Money Markets and Rates.* Available at: http://thomsonreuters.com (subscription only) [Accessed 09 August 2010]

Treasury Select Committee (2011), *Private Finance Initiative.* (The Stationery Office, London). Available at: http://www.publications.parliament.uk [Accessed 06 December 2011]

UKTI (2011), *Database of business opportunities.* Available at: http://www.ukti.gov.uk/uktihome/businessopportunity/121781.html [Accessed 06 December 2011]

University College London Hospitals (2000). *Final business case*. (UCLH, London).

University Hospital Birmingham NHS Foundation Trust (2006), *Birmingham New Hospitals Project – Full Business Case June 2006.* (UHB, Birmingham).

University Hospitals Coventry and Warwickshire (2002), *The Walsgrave Hospital PFI Project – Full Business Case.* (University Hospitals Coventry and Warwickshire, Coventry).

University Hospital of North Durham (1998a), *Dryburn Hospital: Base Case Financial Model.* Accessed through a Freedom of Information response, November 2008.

University Hospital of North Durham NHS Trust (1998b), *Dryburn Hospital PFI Capital Project – Full Business Case.* (UHND, Durham).

University Hospital of North Durham NHS Trust (1999c), *Bishop Auckland Hospital PFI - Full Business Case.* (UHND, Durham).

University Hospital of North Durham NHS Trust (2002), *Chester-le-Street Hospital PFI - Full Business Case.* (UHND, Durham).

University Hospital of North Staffordshire NHS Trust (2007), *Modernising Health Services in North Staffordshire - Full Business Case Version 1a and 1b.* (UHNS, Stoke on Trent).

Välilä, T (2005), 'How expensive are cost savings? On the economics of public-private partnerships', *EIB Papers*, Vol. 10, No. 1, pp. 94-119, (European Investment Bank, Luxemburg).

Vincent-Jones, P (2006), *The new public contracting: regulation, responsiveness, relationality.* (Oxford University Press, Oxford).

Walsall Hospitals NHS Trust (2007), *Full Business Case.* (Walsall Hospitals NHS Trust, Walsall).

Wandsworth; Richmond and Twickenham; and South West London and St George's Primary Care Trusts (2004), *Queen Mary's Hospital Redevelopment (Roehampton) - Full Business Case.* (Support Services Partnership, South West London, London).

Wan, T. Y. Lin. and A. Ma (2002), 'Integration mechanisms and hospital efficiency in integrated healthcare delivery systems'. *Journal of Medical Systems*, Vol.26: 2127–43.

Weinstock, D (1982), 'Using the Herfindahl Index to measure concentration', *The Anti-Trust Bulletin.* Summer, pp. 285-302.

Weiss, L (1974), 'The Concentration-Profits Relationship and Antitrust', In H. Goldschmidt, H. Mann, and J. Weston (eds.) *Industrial Concentration: The New Learning.* (Little, Brown, Boston).

_______ (Ed.) (1989), *Concentration and Price*. (MIT Press, Cambridge).

Welsh Assembly Government (2011), *Draft Budget 2011*. (Welsh Assembly Government, Cardiff).

West Middlesex University Hospitals NHS Trust (2001), *Full Business Case.* (West Middlesex University Hospitals NHS Trust, London).

Whittington Hospital NHS Trust (2002), *The Whittington Hospital Redevelopment – Full Business Case.* (Whittington Hospital NHS Trust, London).

Willetts, D (1993), *The Opportunities for Private Funding in the NHS*, Occasional Paper. (Social Market Foundation, London).

Williams, A (1978), 'Need–an economic exegesis'. In: Culyer, A and Wright, K (eds). *Economic aspects of health*. (Martin Robertson, London), pp. 32-45.

Williamson, O (1985), *The Economic Institutions of Capitalism*, (The Free Press, New York).

Williamson, O (1990), 'Transaction cost economics and organisation theory', in O. Williamson (ed) *Organisation theory: From Chester Barnard to the present and beyond*. (Oxford University Press, New York).

Winnett, R (2011), 'NHS hospitals 'crippled' by PFI scheme', *The Telegraph,* 21 September, p.3. Available at: http://www.telegraph.co.uk/health/healthnews/8780363/NHS-hospitals-crippled-by-PFI-scheme.html. [Accessed 21 September 2011]

World Bank (2007), *Public private partnerships in the new EU member states: managing fiscal risks*, (World Bank, Washington).

_______ (2008), *Landmark public-private partnership (PPP) healthcare agreement signed*. (World Bank, Washington).

World Health Organization (2008), *The World Health Report – Primary health care: now more than ever.* (World Health Organization, Geneva). Available at: http://www.who.int/whr/2008/en/index.html. [Accessed 01 April 2011]

World Health Organization (2010), *The World Health Report – Health systems financing: the path to universal coverage.* (World Health Organization, Geneva). Available at: http://www.who.int/whr/2010/en/index.html. [Accessed 01 April 2011]

Wright, O (2011), 'Companies told to help cut £200bn PFI bill or risk missing contracts', *The Independent,* 17 February, p. 2.

Yescombe, E.R. (2008), *Public-private partnerships: Principles of Policy and Finance*, (Elsevier Finance, London).