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Science, Standards and Infrastructure Provision through the PFI – a case study of the National Physical Laboratory

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Abstract

This paper utilises evidence from the first collapse of a private finance initiative in the UK, that of the National Physical Laboratory, to examine the reality of PFIs in contrast to the rhetoric presented by government. Our conclusions are that the episode provides important evidence of fundamental weaknesses in PFIs.

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Physical Finance: The unravelling of the National Physical Laboratory PFI

Neoliberal states are distinguished by a high degree of interpenetration between the public and private sectors (Dean, 1999). A significant marker of such developments in the UK is an increasing reliance on formal public-private partnerships (PPPs) and the development of a 'public services industry' comprising private and third sector suppliers to whom a range of capital and operational services are now outsourced (BERR, 2008). These 'can cover all types of collaboration across the interface between the public and private sectors to deliver policies, services and infrastructure' (Treasury website A).

Access to private finance to fund such partnerships is usually through a private finance initiative (PFI). PFI is a central plank of the development of the public services industry (BERR, 2008). By 2008 there were more than 620 extant PFI schemes with a total capital value in excess of £58billion (Treasury website A). In 2007 the stream of future repayments against PFIs was estimated at £170bn by 2032, with a net present value of £91billion (Guardian, 2007).

Such partnerships require not traditional bureaucracies but fast, fluid and innovative 'entrepreneurial' states (Du Gay, 2000) whose activities are framed by formal contracts with private businesses and third sector partners. These contracts purport to be rational and calculative (Dean, 1999) and freely deploy concepts such as 'efficiency' and 'value for money' (VFM). These contracted-for state activities tend to be rendered accountable through similarly rational and calculative means. For instance, PFIs tend to be justified via a technical demonstration of VFM compared with public procurement routes (see for example: Treasury, 2006: para 1.6 and paras 2.28 – 2.32).

These accountability forms may be problematic for two reasons. First, factors such as the 'contractual veil' of commercial confidentiality, very long term commitments (Lonsdale, 2005) and counterfactual considerations (Coulson, 2008) can make it difficult to properly call such schemes to account. Second, political or ideological factors may well provide the imperative for those involved to produce acceptable rational and technocratic justifications for PFIs which can be hard to displace (especially in circumstances where the involvement of the private sector means that details have to be treated as confidential). For instance, Coulson (2008) notes, drawing upon work such as that of McFadyean and Rowland (2002) and Heald (2003), that the go-ahead for projects was often contingent upon PFI being the chosen route, incentivising managers to 'prove' that PFIs offered VFM.

The scale of PFI funding in important areas of public service delivery, combined with potentially problematic accountability means that PFI may constitute a significant area of unquantified risk to public finances and services. Indeed, some evidence is emerging of a not entirely satisfactory performance record. The recent Treasury document *PFI: strengthening long-term partnerships* (Treasury, 2006) both lauds PFI and addresses a number of problem areas. This report was written in the context of some dramatic events: in 2004 a PFI scheme to build and operate new science facilities for the UK's National Physical Laboratory (NPL) became the first in the UK to collapse. Since then others have followed suit – notably the NHS's Paddington Health Campus in 2005 and, more recently, the London Underground scheme with Metronet in 2007.

Despite acknowledging numerous failings and weaknesses, *PFI: strengthening long-term partnerships* (Treasury, 2006) states that 'PFI's track record in supporting public service delivery means that the Government remains committed to using it as a procurement route' (para 1.2). The report outlines a variety of technical solutions to enhance PFI. As with many other such 'evidence-based policy' studies (Boden and Epstein, 2006) this report fails to offer any radical or fundamental critique and is, at heart, inherently self-referential and designed to enhance an existing policy. The promotion of technical enhancements to managerialist tools of government has, for their promoters, the benefits of both attenuating criticisms of operations by acknowledging past faults and offering reassurance as to future performance by 'fixing' them.

This paper seeks to undertake a critical examination of PFIs in order to help inform future policy and its analysis in a somewhat more challenging manner. Given the accountability issues noted above, this begs the question of how best to undertake such investigations. A valuable line of enquiry may lie in undertaking 'critical incident' studies to provide a suitable and richly detailed window on the functioning of such schemes. Accordingly, this paper utilises a National Audit Office report (HC 1044, 2006) on the failure of the NPL PFI which offers a 'rich picture' of events. Of course, such methodologies are always open to the criticism that this was an exceptional event, or that subsequent enhancements to PFI mean that the problems will not re-occur. However, we argue in this paper that the NPL collapse points to fundamental problems with PFI and that recent 'fixes' of the scheme offer only limited prospects for real solutions.

In this paper we first summarise the rhetoric that sustains PFI as a vehicle of choice for the current government. We then describe the reality of the NPL PFI,

extensively drawing detail from the NAO report (HC 1044, 2006). The NPL scheme is then evaluated against the criteria commonly identified in the literature, namely, contestability, efficiency and risk transfer and we assess the extent to which a range of subsequent 'technical fixes' may prevent such future occurrences. This is followed by some conclusions.

PFI – The rhetoric

PFI is a complex instrument in which private sector partners typically finance public capital projects (for instance, hospitals), build the projects and operate them as facilities for a fixed period (usually 25-30 years). The public sector leases these facilities and has the benefit of associated operational services (such as cleaning or maintenance) for the defined period, after which they become public assets. The private partner recoups its costs (including capital financing costs) through the lease payments and is incentivised to be efficient via the payment mechanisms and a profit element in the lease pricing. PFI therefore has two phases – the construction and the subsequent operational. This paper, because of the nature of the data used, addresses only the construction phase.

PFI is always likely to be more expensive than projects undertaken directly by the public sector because government can obtain finance more cheaply than the private sector (Coulson, 2008; Froud, 2003) and because of the necessary profit element. This begs the question of why they are so popular with government. One reason may well be that significant upfront direct borrowing by government for such capital projects has a massive adverse impact on the public sector borrowing requirement (Ball et al., 2000; Grout, 1997). However, the UK government maintains that the sole justification for PFI lies in the enhanced VFM that can be achieved (Treasury, 2003:2; Treasury 2006: para 1.6).

The demonstration of VFM is grounded in axiomatic notions of the benefits of competition, free market efficiencies and of financial incentives. It is argued that VFM is achieved in PFI via competitive contract tendering processes, the introduction by the private sector of new and improved design solutions and ways of working, and the transfer of risk (Broadbent and Laughlin, 2005; Froud, 2003). We consider each in turn briefly.

First, Stone argues that 'the PFI process has undoubtedly delivered a sea change in contestability into the provision of public services, providing a proper challenge for monopolistic provision from purely within the public sector' (2005:122). Proponents of PFI assert that such contest enhances VFM. Bing et al

(2005) argue that one of the critical success factors identified for a successful PFI is a strong and good private consortium. Implicitly, this should emerge from a rigorous tendering process that generates sufficient contractor interest to provide appropriate levels of competition. PFI is therefore dependent upon a strong private sector supply side, with efficient firms ready to compete.

Nonetheless, PFIs have been subject to criticism that the cost of bidding is prohibitive, the bidding process too lengthy and that the extremely complex contracts require a high level of legal and other specialist input (Ball et al., 2000; Treasury, 2006). This may, of course, deter tenderers. At the same time, the complexity of PFI projects can leave the public sector vulnerable in negotiations; the private sector is able to devote superior resources to the process (Inman, 2005; Treasury, 2006). Thus competition for PFI contracts may be far from perfect, bringing into question the extent to which efficiencies can be realised.

Second, Dixon et al (2005) argue that PFI procurement is quicker, cheaper and better at ensuring projects are delivered on time, to budget and in accordance with specifications. This is often deemed to be the product of more aggressive and disciplined methods of procurement, with the discipline applying both to private and public partners and the latter in particular made to address longer term issues (Dixon et al, 2005). It is claimed that PFI has delivered a substantial part of the government's investment programme on time and to budget (Bell, 2005) and more effectively than conventional procurement (Stewart, 2005). Of course, as Froud (2003) suggests, we cannot know with certainty what project outcomes would have been had they been undertaken by the public sector – a point specifically addressed by Coulson (2008).

Third, and crucially, 'transfer of risk is a key element of PFI and is closely related to the value for money issue' (Ball et al 2000:104). Proponents argue that PFI allows the transfer of project risks such as cost overruns or design failures to the private sector contractor. Anticipated savings arising from this avoidance of risk constitute the primary VFM justification for PFIs. Risk is transferred to the private sector contractor via the contracting system (Froud 2003).

Risk transfer arguments assume that risk creates an efficient financial incentive to bring projects in on time and to specification (Allen, 2001). Dixon et al (2005) argue that the greater certainty of performance, and therefore efficiency, associated with PFI procurement, particularly for construction projects, is attributable to the increased transfer of risk to the private sector. This results, they argue, in a higher level of due diligence before entering into contracts and

more detailed specifications. Any public sector underwriting of this transferred risk would undermine this incentive (Ball et al, 2000).

Froud (2003), in offering a thorough critique of these ‘technicist’ risk transfer arguments, suggests that they are deployed opportunistically because they justify the offsetting of the higher costs of private contracting compared to public sector procurement. She argues that PFI conflates *measurable risk* with *unmeasurable uncertainty* in highly problematic ways. Obviously, only known and calculable risks can be incorporated into contracts and transferred to the private sector. Yet, by conflating risk with uncertainty, PFIs create the illusion that government is also ridding itself of uncertainty. Moreover, contracts may be incomplete and may, in themselves, create new risks/uncertainties for the public sector – for instance, the risk of the contractor failing. She concludes

‘The use of contractualised risk transfer as an attempt to control the future is flawed, not simply because such contracts cannot anticipate the necessary range of circumstances and possibility, but that, in limiting the scope of the state, the ability to respond to (and shape) the future is circumscribed.’ (Froud, 2003:584)

We turn now to a rich picture of the NPL PFI in order to demonstrate how these normative assumptions regarding PFI translate in action. Save where otherwise indicated, the factual detail draws almost exclusively from the NAO report (HC 1044, 2006).

PFI – The Reality at the National Physical Laboratory

NPL was established by government in 1900 to provide the reliable metrology¹ systems essential to a successful modern economy and safe civil society. NPL² is still based on and operates at its original site at Teddington in south west London. Under successive Conservative governments from 1979 to 1997 NPL and similar government research establishments (GREs) were subject to an intense and sustained programme of new public management reform (Boden et al 2004). Whilst many GREs were privatised, NPL escaped this largely because of the public good nature of its work in support of UK competitiveness (Boden et al

¹ Metrology is the science of measurement of the physical world – for instance, volume, temperature, size, length and time. Systems of metrology provide ultimate ‘reference standards’ by which other instruments can be uniformly calibrated. The now redundant metre rod set in the ground in Paris is a classic example of metrological practice.

² Details about the NPL can be found at <http://www.npl.co.uk/>

1998). Instead, in 1995, NPL became the first UK government owned—contractor operated (GOCO) entity. The Department for Innovation, Universities and Skills (formerly the Department of Trade and Industry) owns NPL, but contracts Serco, a global facilities management corporation, to run it. In turn, Serco subcontracts the management of the facility to its subsidiary, NPL Management Ltd (Whelan, 2000). Serco was recently reappointed after beating off competition from QinetiQ plc, the recently privatised former defence GRE.

Metrological science requires sophisticated facilities to minimise the impact of environmental variables (such as noise or vibration) on its sensitive instrumentation. Both before and after contractorisation, NPL was experiencing severe difficulties with its site. The buildings were old, bisected by a public road and commercial operations were illegal in some buildings designated as a Royal Palace; NPL was in need of new facilities in order to develop its business (Whelan, 2000).

In 1998 work began on the construction of new laboratories and engineering workshops on vacant land at NPL's site under a PFI scheme. NPL drew up a stringent technical outcome specification designed to provide high environmental stability, low vibration and minimised exposure to magnetic and electromagnetic fields. It then invited private sector partners to design a solution, raise the necessary finance and construct, operate and maintain the resulting capital asset which would then be leased by government but occupied by NPL Management Ltd.

Whilst PFIs are legally complex and high-value financial instruments that involve many players over long periods, the NPL scheme added technological complexity to this mix. We argue that four factors – business, money, law and technology – were locked into what was to prove an inherently unstable complex relationship in this instance.

Ten initial expressions of interest in a contract for the redevelopment, reorganisation and management of the NPL site were received in response to the DTI's call. Four respondents were invited to tender, of which one withdrew and another did not respond to the invitation. Unable to increase the number of bidders without restarting the process, the DTI opted to proceed with a short list of just two consortia bidders – Osborne and Laser.

The new NPL facility was to consist of over 400 laboratories, workshops, offices, meeting rooms and other supporting facilities arranged over sixteen interlinked

modules. The technical outcome specification did not determine how the laboratory should be built, but rather what the new facilities should offer in terms of environmental conditions, space, services provided etc. This specification was a major plank in the DTI's strategy for transferring design risk to the private sector provider.

The new facilities were to be consolidated on a smaller area within the existing site, releasing surplus land for potential development for housing by the private partner. This development opportunity was an important financial incentive and bidders were encouraged to factor it into their bids. In the event, this attractive opportunity somewhat distracted the remaining bidders from the exacting technical specification. Indeed Osborne did not even discuss the technical specification with NPL scientists before submitting its bid.

Working to DTI instructions to ensure that each bidder fully appreciated the technical requirements, the bid evaluation team concluded that neither Laser nor Osborne had demonstrated that their design could meet the stringent temperature controls required in some of the space. The team proposed that the DTI instruct the bidders to improve their designs for one of the laboratories in order to demonstrate their ability to meet the required specification for the whole build. This was not done and, rather than re-launch the whole tendering process, the DTI selected Laser, a consortium of Serco Group plc and John Laing plc formed specifically for this project, as preferred bidder.

In July 1998 the DTI awarded Laser a 25 year contract to design, finance, build and operate the new laboratory. The budgeted capital cost was approximately £96 million, to be financed by bank loans raised by Laser. The DTI agreed to make 25 index-linked annual lease payments, set initially, at £11.5m. Payments would be phased in as NPL progressively occupied the new buildings.

Laser's consortium members divided the work between them and contracted two of their respective subsidiaries: John Laing Construction (JLC) was to construct the laboratory and Serco Ltd was to manage the completed facilities.

The DTI continued to have reservations about Laser's design and these remained unresolved after the contract was signed and construction began. This continued and eventually fatal inaction was a consequence of DTI compliance with PFI principles intended to ensure that the design risk was transferred entirely to the private sector. These principles inhibited the DTI from becoming involved in design issues – action which this would have constituted proactively helping to

create the design and consequently sharing the associated risk. Rather, the intention was that Laser would, incentivised by the risk it had accepted (for instance, not receiving lease payments until the building modules came into use) and the prospect of profit, resolve the deficiencies of their own volition in order to deliver the specified outcomes.

JLC was on a fixed-price contract that included penalty clauses for delays in completion. As the design's deficiencies quickly turned into construction problems the DTI felt unable to intervene because this might have prejudiced the legal contractual protection it enjoyed (for instance, if it had changed the specification) and would have involved accepting risk back from a private supplier.

At this point governance failings began to emerge within Laser: it had insufficient power to ensure that JLC resolved these problems. By the time JLC admitted that the flaws were serious it had already received £76m of its £82m fixed fee, even though only 9 of the 16 building modules were complete. JLC estimated the rectification costs at a further £45m, which left it with little appetite for finishing the job.

In November 2001 John Laing plc sold JLC, which was experiencing financial difficulties following its role in the troubled Cardiff Millennium Stadium project, for £1 to a competitor. John Laing plc, which retained responsibility for the NPL contract, then concluded a supplemental deed with Laser to which the DTI was not party and to which it did not agree. This replaced JLC's obligation to finish the job to an agreed outcome specification with one of completing an agreed list of works – that is, agreed inputs. Laser argued that this protected the project from Laing walking away completely. Laser, a small special purpose vehicle with limited assets, was now liable for the full cost of further overruns and damages. We argue that this means that the DTI's protective and risk-transferring contractual umbrella had evaporated.

Laser, which had always had only a narrow financial operating cushion, started to experience a cash squeeze, especially as delays in completing the early modules meant that it was not receiving the anticipated income stream from the lease payments. By 2004 it had run out of cash trying to fix the problems and its private lenders were unwilling to extend their credit facilities, step in themselves or appoint a new firm to finish the job because of the degree of uncertainty surrounding the technically complex project. Nearly four years late on a three year project, Laser suggested a negotiated termination of the contract to the DTI.

Under the ensuing deal, signed in December 2004, the DTI took ownership of the buildings for a lump sum payment of £75m and was relieved of all further annual payments. By 2005 the DTI had expended £122m on buildings valued at £85m, with an estimated further £18m to be spent by it to rectify the faults. It had paid £9m in professional fees alone to deal with the legal, financial and technical problems. The termination payment almost certainly prevented a lengthy legal battle over the contract, which would have undoubtedly further delayed the project. Whilst, in the circumstances, the agreement was probably the best the DTI could achieve, eight of the four hundred parts of the facility will not be built to the required specification and the project was finally completed only in 2007. The National Audit Office concluded that in this case ‘...the Department (DTI) did not achieve value for money in the short to medium term but did protect its downside position’ (HC 1044, 2006:6).

Reality versus Rhetoric – Some analytic conclusions

We turn now to an analysis of how well the NPL PFI fared against the rhetoric of PFIs.

Contestability

Ensuring the VFM of PFIs relies in the first place on rigorous contestability in the process of letting contracts, including a strong and healthy competition, a well-conducted tendering process and the presence of strong consortia as bidders. The NPL PFI was deficient in all three regards.

First, the invitation to tender did not elicit a strong list of potential bidders. The DTI’s own advisors, asked to investigate why some potential tenderers had not submitted expressions of interest, concluded that some had not been alerted to the opportunity whilst others had thought the project either too small or unsuitable to their construction capabilities – the specification was technically demanding (HC 1044, 2006). Nevertheless, the DTI, anxious to press on with the scheme, failed to stay the process and rethink its approach. Thus it failed to ensure that there was a sufficient pool of competitors for the work. This may point to the unsuitability of PFI and the problematic nature of competition in highly specialised projects.

Second, the tendering process was weak. The NAO report reveals that the inclusion of surplus land for housing development within the project strongly influenced the behaviour of bidders or potential bidders. The Beazer

Homes/Balfour Beatty consortium did not submit a bid at all, despite being invited to do so, due to concerns about obtaining planning consent for housing. Osborne submitted a bid but, due to a primary interest in the housing land, did not consult at all with NPL scientists on the technical details surrounding the construction of the laboratory. The NAO concluded that the incentive of land for housing detracted from the main purpose of the procurement process and attracted companies to the competition whose primary expertise was not in construction of sophisticated technical facilities.

The weaknesses in the tendering process may have been even more profound than this. NPL was nested within a complex governance structure: owned by government, operated by Serco and charged with complex scientific tasks. Yet internal procedures meant that the DTI pressed ahead regardless of concerns about evident failings in the process. The DTI uncritically placed its trust in the efficacy of the PFI process to overcome these shortcomings, without paying due regard to the need to set projects up properly in the first place. Many bodies including the National Audit Office (HC 730, 2002) and the Parliamentary Public Accounts Committee (HC 764, 2003) have expressed concerns about the capacities and capabilities of public sector purchasing and contracting functions dealing with PFI projects (Lonsdale, 2005).

Third, and crucially, the tendering process failed to attract bids from strong consortia. Neither Laser nor Osborne proved themselves capable of engaging satisfactorily with the technical demands of the specification. Despite this, the DTI ignored the suggestions of its own advisors that Laser should be required to demonstrate its capacity in this regard. Again, this points to a lack of robust governance in the tendering process. But weaknesses in the consortia bidding went beyond technical capacities to the financial. In particular, Laser operated on a very narrow financial cushion and without the income stream from lease payments on the building modules as they were commissioned, the consortium quickly got into financial difficulties.

Private sector efficiencies

Difficulties arise, of course, with assessing whether or not Laser was more or less successful and efficient than any public sector procurement process would have been. But, plainly, the private sector contractor in this instance failed to deliver this project on time and to specification.

The necessity of raising private finance should, in theory, act as a discipline on the contractors to act efficiently to attract funding. In the same vein, the

willingness of financial markets to lend for such projects signals confidence in their efficiency. Some PFIs have, through necessity, been refinanced successfully. But inefficiencies in this project are suggested by the financing difficulties it experienced. Funding for this PFI came through the finance market via loans from Bank of America and Abbey National Treasury Services plc. During the course of the project both lenders decided to exit the UK's project finance market and wanted to dispose of their loans to Laser and considered selling them to the secondary financial debt market. This, combined with the unwillingness of other lenders to re-finance the project, suggests that the discipline of the financial markets had failed in this instance to effect efficiencies. The NAO estimate that losses for the private sector companies involved due to cost overruns in the project were considerable and that total spend by these firms was £178 million on buildings that were valued at £85m (HC 1044, 2006).

Transfer of risk

As with all PFIs, the transfer of risk from government to Laser became a major justification of this contract. The DTI placed immense faith in the power of this risk transfer to ensure that Laser delivered the project on time and to specification. But events demonstrate that the DTI had not secured for itself a certain future because, ultimately, it had no power to compel the outcome it wished and no power to transfer uncertainties or to avoid the generation of new risks through the mechanism of the contract. For instance, it relied on an outcome specification to ensure that the facility was fit for purpose, but was unable to control the new risk generated when, following the sale of JLC, John Laing PLC and Serco agreed the supplemental deed. Similarly, government was unable to avoid the hazards created by the unwillingness of the finance markets to re-finance the project. In the final analysis, the consortium members could walk away from the contract but the government could not walk away from the need to build the new facility.

Despite this failure to effectively transfer risk, government's belief in the power of the contract and of the totality of risk transfer prevented it from acting proactively at an earlier stage because this would have imperilled the contract. Thus the transfer of risk effectively inhibited government's agency in the manner posited by Froud (2003). The reality is, of course, that the risks transferred to Laser were unsustainable within the consortium and led to its collapse. Because of the essential public good nature of NPL's work, the DTI could not simply allow the project to collapse. Yet, from the outset, the DTI had felt constrained about any intervention that might be seen as accepting risk back into the public

sector. Such was the power of this prohibition that the DTI was only able to act when Laser itself was obliged to seek termination of the contract.

In fact, due to the interconnectedness of Serco with both Laser and the NPL GOCO, it is possible to argue the government never transferred its risk. It was obliged to provide the facilities under the terms of its GOCO – to the same firm that was a major partner in the consortium to provide the facilities. Such entanglements are not uncommon in neoliberal Britain and considerably complicate risk transfer arguments.

PFI: strengthening long-term partnerships (Treasury, 2006) acknowledges in general terms many of these issues, but does refer to the NPL episode directly. This report, as with its predecessors (e.g. Treasury 2003), it seeks resolutions in terms of ‘enhancements’ or ‘improvements’ of PFI processes instead of developing a more fundamental critique.

PFI: strengthening long-term partnerships, maintains that the long lead times in letting contracts are because of the need to exercise due diligence (Treasury, 2006: para 2.20). Since its 2003 report *PFI: Meeting the investment challenge* (Treasury, 2003), government has been working on compressing the time scales by using more standard contracts and also improving public sector skills. *PFI: strengthening long-term partnerships* (Treasury, 2006) notes that this has had some limited effect on shortening the contracting period, but that there is further room for improvement. At the same time, government now stresses the need for greater preparatory work by the public sector before contracts go to market and also an emphasis on maintaining the ‘competitive tension’ (para 3.10). By 2006 it was proposing that this could be achieved by further enhancing skills and establishing ‘best practice’. At the same time, the Treasury (2006) was saying that there would be better and more effective monitoring of projects prior to ‘engaging the market’ to ensure their commercial viability and VFM. These aims appear somewhat contradictory, or at least difficult to achieve in practice, and the solutions offered appear fairly ‘soft’ – mostly in terms of improving training and support.

Unsurprisingly, *PFI: strengthening long-term partnerships* (Treasury, 2006) offers few suggestions with regard to how private sector efficiencies save for one major area – that of private finance. Notably, the Treasury states that it will seek methods for improving the ‘transparency of private finance within PFI projects’ (Treasury, 2006: para 1.32), including compulsory debt funding competitions in

almost all instances. The implication here is that funding was seen as costing more than it should, adversely affecting VFM.

On risk transfer *PFI: strengthening long-term partnerships* (Treasury, 2006) is considerably more reflexive. The report talks much of 'risk sharing' and acknowledges that PFI does entail the retention of a variety of risks (which Froud (2003) would call 'uncertainties') within the public sector. Risk is transferred, the report avers, to create the necessary disciplines for the private supplier to be appropriately incentivised. Accordingly, 'the risks that the Government seeks to transfer are specifically identified and limited' (Treasury, 2006: para 3.39).

Such a system rests upon the ability of public sector procurers to correctly define and effectively transfer the selected risks in an optimal manner such that the residual risks retained are known and manageable. This may be difficult to achieve in practice. Attempts to achieve such transfers envisage a PFI system in which procurers have greater hands-on involvement. This includes, for instance, doing more design work from the outset before the project is taken to market and offering forms of credit guarantee. Such approaches might conflict with assumptions of private market efficiency and curtail the demonstrable degree of risk that can be transferred. These solutions are, the Treasury acknowledges, critically dependent upon contracts being highly effective and, to that end, it advocates improvements in standard contracting techniques and processes.

This case study of the NPL PFI clearly demonstrates that in terms of generating contestability, efficiency and risk transfer – the central tenets of PFIs – this project was a significant failure and highlights a number of issues. First, the PFI locked together a number of actors with quite different competences and interests. The DTI were the owners of NPL but had sought to largely distance itself from the organisation through the outsourcing GOCO contract. DTI were far from an 'intelligent customer' for the laboratory's services, on which it relied heavily. The DTI, concerned to act under PFI principles, appears to have been heavily committed to the notion that it had successfully transferred risk and, therefore, that the problems were not anything it could either act upon or take responsibility for. The second major group of actors were the Laser consortium and, behind that, Laing and Serco. These PFI partners had, despite Serco's other involvement with NPL, failed to engage with the complexities of the task that they had taken on. Their relationship with the DTI was framed by a legal, financial contractual instrument (the PFI contract) and was mediated by a range of expensive to employ professionals such as accountants, lawyers and surveyors. The third partners were the scientists of NPL themselves and their

stakeholders in the wider economy and civil society, who despite being the end 'customers' for the buildings and the experts on what was required and why, had a minimal involvement with the construction of the new laboratory.

Relationships between these groups of actors were primarily mediated by legal, financial and contractual means, a mechanism designed to transfer risk. Because Laser and the DTI were the contracting parties this meant that their contractually determined relationship came to dominate over the end users of the buildings. Specifically, the DTI's legal and financially sensible inhibitions over intervening to rectify the project's failings demonstrate that, in this case at least, financial and contractual considerations got in the way of good technology to the disbenefit of NPL. NPL was able to continue to use its old facilities, but must have suffered adverse consequences as a result of at least a five year delay in moving to new and much-needed premises.

Second, this problem of the dominance of legal contractual thinking was exacerbated by the absence of competence in complex areas of technology within Laser. This is likely to be especially problematic with one-off specialised buildings such as laboratories, and particularly when the private partners are non-specialised construction firms. Moreover, muddying the project waters with profit incentives such as house-building is unlikely to attract the right potential contractors.

Third, this case explodes the myth of legally impregnable risk transfer to the private sector. In circumstances where the contractor is simply unable to cope with the demands placed on it, it may just collapse or walk away. Government, committed to providing scientific services vital for economic competitiveness has no such option. The fact that interest in the PFI invitation in this case was so poor and that Laser's lenders were unwilling to step into the breach indicates that these were risks which, once assessed, most rational private sector players were unwilling to accept. Whilst government may have transferred the specified risks to Laser, it was left with the burden of the uncertainty surrounding the completion of the project.

Fourth, this episode highlights the vulnerability of PFIs to weak corporate governance arrangements within contracting firms once difficulties start to accumulate. Allied to such governance issues, this PFI illustrates a potentially huge deficit in contract management competence within government.

Finally, and perhaps of most general interest, is the fact that the National Audit Office has concluded that the termination payment will ultimately constitute value for money. The DTI will spend at least £140m on a project whose estimated total capital costs is £130m (2005 prices) and has avoided a costly and lengthy legal battle. Additionally, it will have to pay for operating the buildings for NPL. However, at the cost of £75m, the DTI has relieved itself of paying index-linked annual service charges in excess of £300m to Laser over 24 or so years – a fact not dwelt upon in the NAO's report. Of course, government has now had to take the buildings 'on balance sheet'. The private sector's loss is not just the capital loss on the project itself (put at some £101m), but the loss of this valuable future income stream, funded by the taxpayer. Such calculations point, perhaps, to the significant long term costs of PFI and indicate that their VFM is not always beyond doubt.

This case study points to serious shortcomings in PFIs in operation as distinct from the normative case made for them. It is not possible to say with certainty whether the implementation of *PFI: strengthening long-term partnerships* (Treasury, 2006) would have averted the NPL disaster. We argue, on balance, that it would not. The government have now stepped away from PFIs on large IT projects because of their technical complexity. But the NPL project, whilst complicated, was probably not a more challenging build than many advanced hospitals. The shortening of the tendering process would not have had any effect here (its speed was part of the problem), nor would increasing the public sector's engagement with design – the design was well-specified and outcomes based and if NPL had become more involved it would have comprised the risk transfer. We conclude that the ultimate test of PFIs is to see how they bear up to the robust conditions in the real world. This case study provides evidence that should be of real concern.

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