Why PFI Holds No Lessons for Utility Regulation

By Sean Gammons, Richard Druce, and James Grayburn

A report issued recently by the UK’s National Audit Office (NAO) identified a number of problems with the Private Finance Initiative (PFI). Coming at the same time as the bankruptcy of a major construction company involved in PFI projects, the NAO report has led certain politicians and some commentators to question private sector involvement in a wider range of infrastructure projects, including the regulated utilities that provide water, energy, and transport. However, as we argue in this paper, the NAO’s analysis of the flaws in PFI contract design does not undermine the case for private ownership of utilities:

• The PFI model is subject to well-known problems of contract design—problems that were studied and documented in economic literature well before PFI got off the ground;
• Ambiguities in (and omissions from) the NAO report give a misleading impression of the costs of providing infrastructure, and hence of the relative merits of public and private finance; and
• The contract design problems of PFI are addressed explicitly in utility regulation, and indeed the solution to these problems forms the core of the regulatory process.

The acknowledged difficulties of PFI therefore offer no lessons for the regulation of private utilities. As such, it would be wrong to conclude that the problems of PFI require a reconsideration of utility privatisation. On the contrary, the success of utility regulation holds many lessons for the design and implementation of PFI.

The PFI: Also Known as BOO, BOOT, and PPP

The PFI is a programme operated by the UK government whereby public agencies commission infrastructure projects from private companies through contracts to build, own, and operate long-lived facilities using private sector finance (or sometimes just to procure services). In other countries, such schemes are known as BOO (Build-Own-Operate), or BOOT, if ownership of the asset transfers to the government at the end of the contract, or sometimes simply as public-private partnerships (PPP or P3). The scheme began in the late 1990s and took off during the early years of this century under a Labour (left of centre) government. After being revised and relaunched in 2012 as PF2, it continues to operate under the current Conservative (right of centre) government.
As the NAO report points out, PFI offers a short-term advantage to politicians, but has a long-term cost. It is rather like buying assets on hire purchase (or instalment purchase) instead of taking out a loan to buy them outright. The "hire" element of a PFI contract allows public services to use the facility immediately, whilst the "purchase" element obliges the government to repay the cost of building the facility over its expected life.

PFI allows government agencies to commission additional capital investment, which they could not afford to pay for out of their current budgets. The “purchase” element of the contract creates a liability equivalent to a debt, but it is not shown as such in the national accounts. The NAO says this element of PFI “results in lower recorded levels of government debt and public spending in the short term”. PFI therefore effectively allows the UK government to authorise more expenditure, to run a bigger deficit, and to incur larger liabilities (i.e., bigger debts), without having to acknowledge them at the time. The Office for Budget Responsibility has described the use of “off-balance sheet” financing like the PFI scheme as a form of “fiscal illusion”.

**PFI Funding Is Problematic for Several Reasons (Not Always the Usual Suspects)**

Whilst acknowledging the implications for government budgets and budget deficits, successive governments have given different reasons for using PFI. The NAO looked into the stated rationale for the PFI and found the arguments rather weak. However, because of ambiguities in the drafting, some commentators seem to have misinterpreted the NAO report as a general criticism of private sector involvement in infrastructure provision. That is a false interpretation of the NAO report, as explained below.

The NAO reports that the UK Treasury sees an advantage in using PFI to achieve: (1) “certainty over construction costs”, (2) “improved operation efficiency”, and (3) “higher quality and well-maintained assets”. The Treasury therefore requires government agencies to justify their use of PFI by showing that they achieve “cost savings in the construction or operation of the project; or through delivery of a qualitatively superior project”.

In its discussion of benefits through lower construction costs, the NAO cites evidence that PFI projects are delivered within budget more often than non-PFI projects, but also notes that cost certainty does not equate to lower costs. Like-for-like cost data is scarce, but the Department of Education “has, so far, found that the financing route has little or no effect on the construction costs of schools being built as part of the Priority School Building Programme”. Does this mean that public sector provision is as efficient as private sector provision? Not at all. This example only compares different methods of financing investment, i.e., the choice of “financing route” between expanding PFI and raising additional government debt. In both cases, the construction of the facility would be put out to tender with the private sector to minimise costs. Any construction project can run into problems, but the NAO report does not argue that transferring such projects to the public sector would avoid such problems or lower costs in any way.

Similarly, the NAO’s discussion of operational efficiency looks at the difference in the cost of cleaning services between PFI hospitals and other hospitals, but in both cases such services are usually contracted out to the private sector. The NAO report provides no evidence that keeping such services “in-house”, within a public sector body, would be more efficient. Indeed, there are ample grounds for expecting publicly-owned bodies to provide services more expensively and less efficiently than privately-owned companies. Publicly-owned bodies tend to suffer from greater political influence over their decisions and lack incentives to choose efficient options. Both factors gradually raise their costs
(although the excess costs are borne by taxpayers, if their prices are kept low for political reasons). The NAO does suggest that some PFI providers quote higher prices for some services to provide a contingency allowance for unpredictable cost increases. However, the NAO attributes this price increase to flaws in the PFI contract design (we discuss the problem of contract design below). In any case, the NAO notes that the revised PF2 contract normally excludes the provision of such services.\textsuperscript{13}

With regard to maintenance costs, the NAO notes that some PFI contract prices include a contingency allowance for possible cost increases, but also that the lower expenditure on maintenance at non-PFI facilities may simply reflect the budget constraints currently facing public sector agencies.\textsuperscript{14} Cutting maintenance to meet a budget constraint is rarely efficient or in the long-run interests of those using the facility.

The presence of budget constraints, which the NAO itself acknowledges, should have affected the NAO’s discussion of the cost of capital for infrastructure projects. The failure to make this link is a serious omission from the NAO report. The NAO frequently compares the private sector cost of capital (or achieved returns) in PFI projects with the cost of government borrowing, which is much lower. However, this comparison was invalidated as soon as the NAO acknowledged the existence of budget constraints on public sector expenditure. The low cost of the government’s current borrowing is irrelevant to new projects if the government is unable to undertake any further borrowing due to the need to reduce the deficit. In such conditions, the value of cash to public sector agencies—i.e., the public sector’s actual (or “shadow”) cost of capital—is higher than the current government borrowing rate. Indeed, the high value of cash in the public sector is the primary reason PFI schemes seem like an attractive way to finance investment. It is misleading for the NAO to omit this observation from its consideration of PFI.

**Government Provision Does Not Magically Lower the Cost of Capital**

In any case, as far as taxpayers and consumers are concerned, it is a myth that relying on government borrowing has a lower cost of capital than relying on private finance. To society as a whole, the cost of capital of any project depends on the riskiness of that project, not on the way it is financed. This is elementary capital finance theory.\textsuperscript{15} The risk of a project can be shared in different ways between its investors, its customers, and others (e.g., insurers or taxpayers). That allocation of risk will affect the rate of return demanded by investors (i.e., their cost of capital for taking on the project). However, reallocating risk among the members of society does not change the riskiness of the project to society as a whole.

The NAO notes that publicly-owned utilities can borrow at low cost, and are regulated on that basis in the US and Germany, whereas government investment decisions in the UK use a Social Time Preference Rate, which is higher than the government’s cost of borrowing.\textsuperscript{16} The NAO suggests that using government borrowing costs as the discount rate would tilt the balance away from PFI.\textsuperscript{17} In fact, if government agencies and publicly-owned utilities can increase borrowing at all, they can only do so at such low cost because an explicit or implicit government guarantee transfers major project risks onto future taxpayers (and consumers). In essence, when the NAO compares the cost of capital under PFI with the cost of government borrowing, it is counting the cost of (risk-free) government debt, and forgetting the cost of the (risk-bearing) equity provided by taxpayers. In doing so, the NAO is foisting another “fiscal illusion” on its readers.
All these discussions of costs and efficiency concern the choice between PFI contracts and other ways of financing private sector provision of public infrastructure facilities. The NAO report does not suggest that provision by public sector agencies would be more efficient. Indeed, construction and operating costs are likely to be higher in the public sector than in the private sector, given the lack of incentive for public providers to seek out efficiency gains. Any contract has to ensure that private sector providers cannot reduce their costs and increase their profit by reducing the quality of the services provided. However, as mentioned above, the NAO found that public providers were more likely than private providers to skimp on maintenance expenditure, because of cash constraints; PFI contracts seem to encourage adequate expenditure on maintenance.  

In other words, the NAO report might provide grounds for governments to finance private sector provision of investment in public infrastructure by borrowing instead of through PFI, providing one ignores the implicit transfer of costs to taxpayers described above. However, it provides no grounds for assigning the work to public agencies (i.e., no reason for the government to “bring projects in-house”).

**All Long-Term Contracts and Franchises Suffer from Well-Known Problems**

The form of contract adopted for PFI projects is subject to a number of theoretical difficulties which, according to the NAO, apply in practice.

The first problem for any long-term contract is to ensure that it remains in the interest of both parties to abide by the contract throughout its duration. A contract that meets this condition is said to be “incentive compatible”. The contract will fail if, at any time, it becomes unprofitable for one or other of the parties to stick to the terms of the contract for the remainder of its duration.

To be specific, if the future expected costs of completing a contract exceed the future expected revenues under that contract, the provider no longer has any incentive to complete the contract. In these conditions, the contract is “incentive incompatible”. Such conditions have led to providers walking away from a contract, declaring bankruptcy, or giving up a franchise contract. These crises in contract management may reflect poor contract design, but in practice it is impossible to design any long-term contract to anticipate all future developments. Occasional crises in the management of any long-term contract can arise from unforeseen circumstances and should be expected (“To err is human...”).

The hypothetical example in Box 1 may help to explain both the problem and how contractors have tried to address it within the PFI framework.

Overcoming these problems with PFI is not an impossible task. The UK (and other countries) would do well to study similar projects in Chile where, over the last 20 years, the government has awarded many “concession contracts” (i.e., BOOT contracts) for infrastructure, including airports, seaports, roads, and prisons. The government experimented with various auction mechanisms designed to pass risk back to the provider, but encountered the same predictable incentive problems due to cost-escalation and/or under-pricing. The bidding process has therefore evolved over time to define and allocate risks more efficiently so as to avoid post-auction disputes. For instance, (1) incentives to maintain quality were sharpened, (2) revenues were indexed for inflation, and (3) some revenue support was provided if demand failed to materialise at the predicted level. However, a major contribution to reducing unnecessary risk came from a reform of the auction process.
The auction of these concession contracts used to select the bidder asking for the lowest fixed price or toll, but that led to problems of incentive compatibility. Instead, the government now specifies the toll rate for each proposed project and awards the concession to whoever bids the lowest present value of toll revenues—meaning the winning bidder is the one that requires the least amount of revenue to recover its costs and to earn a profit. Once the project starts operation, the government calculates how much of the required present value is being collected in revenues, using a discount rate equal to the cost of capital of the bidding firms. When this calculation shows that the investor has recovered the present value that it bid, the concession contract ends and ownership of the asset reverts to the government. This flexibility over contract duration makes the success of the contract less dependent on demand projections and actual traffic volumes—over which the bidder has little, if any, control.\textsuperscript{21}

**Box 1. How PFI Contracts Become Incentive Incompatible**

The Treasury claims that an advantage of PFI is its ability to provide "certainty over construction costs”. That certainty is provided by fixing at the bidding stage the price per unit that the provider will charge for performing some service over the contract period. During that period, the provider will try to minimise costs. However, the provider remains exposed to the risk of an unpredictable cost escalation caused by factors outside its control. To offset the exposure to this risk, the provider can charge a higher price per unit, but some cost increases can still render the contract "incentive incompatible".

Suppose that the cost (per annum) of building and operating a facility might, with equal probability, be either £90 or £110, depending on factors that the company cannot observe at the time of bidding and that are outside the control of any bidder. No prudent company would simply bid the average cost of £100 and see out the contract whatever happens.\textsuperscript{1}

If the contract price were set at £100, but costs rose to £110, the contract would be loss-making from that time onwards. Any provider would seek either to renegotiate the contract, or to give it up entirely. Failing either of those options, it would be bankrupt.

Instead, the provider might win the contract by bidding a price per unit of £110—sufficient to cover all possible costs, so that the incentive to provide is retained in all circumstances. (The NAO refers to this type of strategy as bidding a "cost premium for risk transfer", i.e., a contingency allowance built into the contract price, in return for transferring risk onto the provider.\textsuperscript{2} In this case, if costs turn out in fact to be £90, the contract may appear—ex post—to be unreasonably profitable. However, this outcome is just a matter of luck, not evidence of profiteering.

The problem here is that a fixed price per unit is not an efficient way to deal with unforeseeable variations in cost that project managers cannot control.

**Notes and Sources:**

\textsuperscript{1} If any company underestimates the cost of construction (e.g., by assuming it is bound to be £90 and ignoring the possibility of £110), it may bid £90 and win the contract with a low price. However, the contract is then very likely to be unprofitable. Such companies suffer from the "winner’s curse”—they find out too late how high costs really are, and then they try to withdraw from the contract. An auction process can be designed to minimise the chance of such outcomes, for instance by allowing multiple rounds of bidding (so that every bidder has a chance to see other bidders’ view of the costs) and by requiring performance bonds (which insure the buyer against the risk of the provider pulling out later).

\textsuperscript{2} See "PFI and PF2", NAO, para. 1.23, p. 18.
The authorities in charge of PFI projects in the UK could learn a lot from this Chilean experience. Good contract design is not based on the fervent but naive hope that everything will work out right this time, despite the frequency of problems in the past. A well-designed contract anticipates the recurrence of similar problems, particularly the need for either party to renegotiate the contract so as to adapt it to unforeseen circumstances. The inevitability of such conditions arising (and hence the need to anticipate them) is set out in the theory of the “incomplete contract”, a concept developed by Sanford J. Grossman, Oliver D. Hart, and John H. Moore. A “complete” contract would contain provisions that anticipated every possible state of the world and so would always be incentive compatible. However, such perfection is unattainable and all long-term contracts are in fact “incomplete”:

“An incomplete contract has gaps, missing provisions, and ambiguities and has to be completed (by renegotiation or by the courts) with strictly positive probability in some states of the world.”

The renegotiation mentioned here takes the form of applying certain guiding principles, set out in the contract and in the law, which allow the parties to redesign the contract in a way that maintains the original purpose of the contract, without tearing up the contract and starting from scratch. The kind of principles that preserve the original purpose of a contract would include, for example:

- That the provider should provide the contracted service to the agreed quality;
- That the provider should recover its costs of providing the service, provided that they are prudently incurred; and
- That the renegotiated price should continue to provide the opportunity to make a fair rate of return or reasonable profit.

Renegotiation of a contract can take place through the courts, using the provisions for renegotiation set out in the contract. More often, they are settled by mutual agreement, especially when the two parties develop a long-term relationship. Such a relationship, extending beyond the term of the current contract, allows the parties to consider the long-term benefits for future projects of reaching agreement on the current one. These examples indicate a viable way forward for the private provision of public infrastructure, such as the utilities that provide water, energy, and transport.

**Regulation of Private Sector Utilities Provides a Ready-Made and Successful Model**

The choice between (1) providing services “in-house” and (2) “outsourcing” them by contracting them out to a private firm depends on whether or not the transaction costs of negotiating, managing, and renegotiating contracts exceed the efficiency gains derived from shopping around for the cheapest provider. That realisation forms the basis of the Theory of the Firm developed by Ronald Coase as long ago as 1937—i.e., integrated firms grow and survive when they provide a more efficient means of organising production than markets governed by contracts. The corollary is that the private sector can provide public services more efficiently that the public sector, if the problems of managing contracts are less severe than the problems of managing publicly-owned companies—which is precisely why private utilities are the favoured model.
The standard model of utility regulation is a tried and tested system designed to cope with the “incomplete” nature of any particular agreement to provide a service, or contract to build and/or operate long-lived assets. It allows consumers of utility services to benefit from the efficiency gains of private operation by building a regulatory system that acts as a form of contract. To deal with the problem of incompleteness, a well-designed regulatory system contains (at least) the elements listed below and described in more detail in Box 2:

- A workable definition of the guiding principle used to set revenues at any time, sufficient to give investors a reasonable prospect of recovering their costs and earning a fair rate of return (defined as the rate required to attract capital) if they meet certain standards;
- A set of accounts that show the public what the provider’s costs have been, and how much has yet to be recovered;
- A procedure for assessing costs to see if they have been prudently incurred and may therefore be recovered in regulated prices;
- A revenue formula that gives the provider an incentive to provide the required level and quality of service by ensuring that prices offer a reasonable prospect of recovering at least the variable cost or operating expenses of each service provided; and
- A review procedure for transparently updating the revenue formula, from time to time or at regular intervals, in the light of unforeseen changes in circumstances, and in accordance with the guiding principle.

Box 2. Conditions for a Successful Regulatory Regime

1. The guiding principle used to set revenues at any time, sufficient to give investors a reasonable prospect of recovering their costs and earning a fair rate of return (defined as the rate required to attract capital) if they meet certain standards. A workable definition of this principle has been finely crafted in the US and Canada. In the US, for instance, all state and federal regulators (a) must set utility prices at the level sufficient to “attract capital” for investment. Furthermore, these prices (b) must offer investors the opportunity to earn a “fair rate of return” (which is by no means the same as guaranteeing a rate of return). This fair rate of return is defined (c) as the “opportunity cost of capital”, i.e., a rate of return comparable with the rate of return earned in other sectors of the economy. Finally, regulators must not only promise to provide this opportunity for future investment, but (d) must also validate promises made in relation to previous investments by giving investors the opportunity to earn a fair rate of return after recovering their investment and operating expenses. These principles are set out in Federal Supreme Court decisions, primarily Bluefield Water 1923 and Hope Gas 1944. The decisions proceed from statements in the US Constitution, but they set out economic principles that apply in any jurisdiction (and which have been adopted in similar terms in Canada).

2. A set of accounts: In the US, regulatory accounting rules have been stable for many years. In Europe, most regulated sectors now produce a set of accounts for regulatory purposes, but some regulators have made more progress than others in finalising the regulatory accounting rules.

3. A procedure for assessing costs to see if they have been prudently incurred. In this context, “prudently incurred” means “reasonably efficiently incurred, as in any normal business”. It does not mean “efficiently incurred” as defined in some European documents, meaning the level of costs that only the most efficient company would incur. The “fair rate of return” is always calculated by looking at average rates of return in comparable sectors, i.e., at firms of average efficiency. Demanding higher than average efficiency would logically require the regulator to set a higher rate of return, comparable with that earned by firms of exceptional efficiency.

4. A revenue formula that gives incentives to provide the required level and quality of service. This standard applies to the price for an individual service. Overall, prices must also permit recovery of the cost of past investments, in order to fulfill the “guiding principle” set out above.

5. A review procedure for transparently updating the revenue formula. In carrying out these reviews, regulators must apply transparent administrative procedures to demonstrate that they are meeting the standards required by the “guiding principle”. This “administrative standard” is in practice just as important for the success of any regulatory system as the “revenue standard” of cost recovery.
Many regulators apply (at least claim to apply) the guiding principle and other elements of a good regulatory system, but few jurisdictions outside North America have enshrined them in law to the extent that investors can rely on them. Formal adoption of these or similar economic principles would greatly reduce the risk of private sector investment in public infrastructure and would help to lower the cost of capital.

To illustrate the risks facing investors outside North America, bear in mind that the standard of “prudence” must be applied to the decision to invest, taking account of conditions at that time. It must not be applied to an ex post view based on current actual conditions (e.g., on whether or not forecast demand actually materialized). Instead, it must be reviewed against the forward-looking view of what was expected when the investor decided to invest. The NAO report appears to violate this rule when it refers to payments continuing under a PFI contract for a school in Liverpool that has already closed (see Box 3).

Box 3. Incorrect, Ex-Post, Application of a Prudence Test

The NAO complains that the Liverpool City Council is “locked into” certain payments, “if no change to the contract is made.” (This example is quoted as an apparent case of wasteful expenditure in a Financial Times article.) However, the Council would also be locked into debt repayments and interest if the project had been financed by borrowing, since the cost of constructing the school cannot be reversed. The closure of the school is not therefore a reason to conclude that the contractor was imprudent or to suspend payments to the contractor. Rather, it is a reason to ask why the Liverpool City Council commissioned the school in the first place, why the school closed, and why the council failed to allow for efficient renegotiation of the contract in light of changed circumstances.

Notes and Sources:
1 “PFI and PF2”, NAO, para. 1.21, p. 17.

Admittedly, it is easier to apply principle 4, regarding total cost recovery, to the revenue formula of a regulated utility than to a “special project vehicle” like those used in PFI. As discussed above, offering an incentive to provide a single service requires only that the price cover its future costs. The problem arises over recovery of the “sunk” cost of investing in long-lived assets. If demand for the services of one asset owned by a regulated utility falls away, the utility can usually recover the costs of that asset by raising prices for services provided by other assets. A company with just one asset is not as diversified and has no recourse to that method of cost recovery if demand for its product falls away. Indeed, one of the distinctions between PFI and a regulated utility is the recognition that a regulated utility needs a regime that encourages continuing investment, whereas PFI was designed to accommodate one-off investments in a single asset. However, the Chilean example shows that this problem can be overcome by offering revenue support in a manner compatible with maintaining good incentives.

Thus, if individual PFI projects had met the revenue conditions listed in Box 2 above, they might have operated more successfully than they did. Regulated private sector utilities have been operating under these (or similar) principles for many years now. In the US and Canada, these principles are tightly defined and stable (which shows that they are viable in a wide range of circumstances); Chile shows how to apply these principles to single infrastructure projects. In Europe and the UK, the development of similar principles is continuing, but remains patchy, unrefined, and hampered by weak legal support. Clarification of, and deeper commitment to, these principles would be beneficial for investment in European utilities, but the regulatory systems must continue to develop until a viable and stable situation emerges. Brexit, and the return to a less-fettered form of political discretion that it implies, will not aid the cause in the UK.
Conclusion

Some comments on the NAO report might be taken to indicate that the NAO favours public sector provision of infrastructure facilities over provision by the private sector. That would be a misinterpretation of the NAO report.

The NAO is right to criticise PFI as a way for public sector agencies to borrow without increasing formal measures of government debt (the “fiscal illusion”) and to dispute the suggestion that PFI contracts offer “certainty” over future costs. However, the NAO has not compared the costs of public versus private provision of infrastructure assets and services, only different ways of financing public expenditure. There are good reasons to believe that public sector provision would be more expensive than provision by the private sector.

Another flaw in the NAO report is the very narrow view that it takes of the cost of government borrowing. The current cost of government debt does not indicate the full cost of borrowing to finance additional investment (1) when the budget deficit is capped or maximised and public sector access to cash is rationed and (2) whenever taxpayers bear the equity risk (of cost escalation or of a fall in demand) for public sector projects. In these conditions, the true cost of government borrowing to finance investment is higher than the cost of debt alone—and may justify incurring private sector financing costs.

For the same reasons, it is wrong, despite what some commentators say, that financing the nationalisation of utilities using increased government borrowing would reduce costs by avoiding the need to pay a return on equity in the form of dividends to private investors. These returns are the cost of bearing the risks associated with investment in these projects; that cost would not go away, but would be borne by the taxpayer, if utility businesses were nationalised.

Aside from arguments on financing, the NAO identifies challenges related to fixed prices in PFI contracts (and franchises) that were entirely foreseeable, since the phenomenon of “incomplete contracts” has been studied and understood for decades. The lessons of this theory—i.e., the need to address the inevitable “incompleteness” of contracts through dispute resolution procedures—have already been incorporated into alternative methods of providing public infrastructure, most notably the established models of regulation for private utilities and other infrastructure.

Those working to improve PFI contracts undoubtedly have much to learn from studying regulation in the UK and other countries. However, it would be wrong to conclude from the NAO report that the experience of PFI has any lessons for the future ownership or regulation of utilities.
Notes

1 The authors would like to acknowledge the help of Graham Shuttleworth in shaping this paper, and Jeff Makholm for his comments.


3 In particular, the Shadow (Labour Party) Chancellor, John McDonnell, has used the collapse of one firm involved in PFI to suggest that all public services should be operated by the government (“in-house”) or by co-operatives. See “Nationalisation was financed, implying that its cost of capital remained constant. Hence to society) was unaffected by changing the way the firm project depended on the characteristics of the project. Subject to and 1960s. They found that the cost of capital for a particular debt for equity on the value of a firm (or project) in the 1950s “Modigliani-Miller theorem”), who studied the effect of swapping to the work of Franco Modigliani and Merton Miller (hence, the The theory can be found in many textbooks, but is usually attributed to the work of Franco Modigliani and Merton Miller (hence, the “Modigliani-Miller theorem”), who studied the effect of swapping debt for equity on the value of a firm (or project) in the 1950s and 1960s. They found that the cost of capital for a particular project depended on the characteristics of the project. Subject to minor effects due to taxation (which turns taxpayers into hidden shareholders of the firm), the firm’s total value to its investors (and hence to society) was unaffected by changing the way the firm was financed, implying that its cost of capital remained constant. Both Modigliani and Miller were later awarded the Nobel Prize for Economics (in 1985 and 1990, respectively). See F. Modigliani and M. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment", American Economic Review, 48 (3), pp. 261–297, 1958; and F. Modigliani and M. Miller, "Corporate income taxes and the cost of capital: a correction", American Economic Review, 53 (3), pp. 433–443, 1963. The theory is encapsulated in the Capital Asset Pricing Model (CAPM), widely used by regulators in the UK and other countries to set the cost of capital for regulated utilities. In the CAPM, required rates of return (i.e., the cost of capital) are driven by the “systematic” (i.e., non-diversifiable) risk of the project. This systematic risk is not eliminated by spreading the risk over tax-payers, so switching to a public source of finance does not reduce the project’s cost of capital. (Of course, vastly increased debt creates the additional risk of default, which drives up the cost of capital for companies and governments alike.)


5 “PFI and PF2”, NAO, para. 1.14, p. 11.

6 Ibid, para. 1.16, p. 11.

7 This ability (or trick, depending on your point of view) is useful to governments that feel unable to increase the deficit any further. The last Labour government ran an (official) budget deficit of 3% of GDP during the boom years of 2003–2007, as if that were the maximum, although the budget deficit rose substantially during the recession of 2008–2010. Since 2010, coalition and Conservative governments have been constrained by the need (or desire, depending on your point of view) to reduce the budget deficit.

8 “PFI and PF2”, NAO, para. 1.16, p. 11.

9 Ibid, para. 1.5, p. 8.

10 In this scenario, the system was assumed to be decarbonised to a point where the average emissions of carbon dioxide from the power sector reach 50 g/kWh.

11 Ibid, para. 1.25, p. 18.

12 Ibid, para. 1.9-1.10, p. 10.

13 Ibid, para. 1.10, p. 10.

14 Ibid, para. 1.11-1.12, p. 10.

15 The theory can be found in many textbooks, but is usually attributed to the work of Franco Modigliani and Merton Miller (hence, the “Modigliani-Miller theorem”), who studied the effect of swapping debt for equity on the value of a firm (or project) in the 1950s and 1960s. They found that the cost of capital for a particular project depended on the characteristics of the project. Subject to minor effects due to taxation (which turns taxpayers into hidden shareholders of the firm), the firm’s total value to its investors (and hence to society) was unaffected by changing the way the firm was financed, implying that its cost of capital remained constant. Both Modigliani and Miller were later awarded the Nobel Prize for Economics (in 1985 and 1990, respectively). See F. Modigliani and M. Miller, “The Cost of Capital, Corporation Finance and the Theory of Investment”, American Economic Review, 48 (3), pp. 261–297, 1958; and F. Modigliani and M. Miller, “Corporate income taxes and the cost of capital: a correction”, American Economic Review, 53 (3), pp. 433–443, 1963. The theory is encapsulated in the Capital Asset Pricing Model (CAPM), widely used by regulators in the UK and other countries to set the cost of capital for regulated utilities. In the CAPM, required rates of return (i.e., the cost of capital) are driven by the “systematic” (i.e., non-diversifiable) risk of the project. This systematic risk is not eliminated by spreading the risk over tax-payers, so switching to a public source of finance does not reduce the project’s cost of capital. (Of course, vastly increased debt creates the additional risk of default, which drives up the cost of capital for companies and governments alike.)

16 “PFI and PF2”, NAO, para. 1.29, p. 20.

17 Ibid, para. 1.30, p. 20.

18 Ibid, para. 1.11, p. 10. “PFI contracts stipulate that buildings have to be maintained to a specified standard: part of the unitary charge covers asset maintenance. Our previous analysis has shown that the contractually agreed standards under PFI have resulted in higher maintenance spending in PFI hospitals. Public bodies have the ability to reduce maintenance spending in non-PFI assets, but this is much more difficult to do under a PFI contract.”

19 Sometimes, it is suggested that the government should overcome problems with private contractors by imposing harsher penalties. In fact, such tactics are counter-productive. Contractors who anticipate the possibility of large penalties may simply decide not to bid for the contract, or else they will bid a much higher price, sufficient to provide recompense for any such penalties.

20 Resolving a crisis within contract management does not always mean passing through any additional costs to customers, or any other form of “bail-out”. Sometimes, it is better to let the provider fail, to encourage other providers to be more disciplined, as when the Federal Reserve allowed Lehman Brothers to go bankrupt in 2008. Such “tough” treatment is, if anything, more likely with private sector providers than with public sector providers, which helps to explain why the public sector has a weaker incentive to be efficient.


23 O.D. Hart, Firms, Contracts, and Financial Structure, Oxford University Press, 1995. Oliver Hart and Bengt Holmström jointly received the Nobel Prize for Economics in 2016 for their work on contract theory.

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NERA Economic Consulting (www.nera.com) is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges. For over half a century, NERA’s economists have been creating strategies, studies, reports, expert testimony, and policy recommendations for government authorities and the world’s leading law firms and corporations. We bring academic rigor, objectivity, and real world industry experience to bear on issues arising from competition, regulation, public policy, strategy, finance, and litigation.

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Contacts

For further information and questions, please contact the authors:

Sean Gammons
Managing Director
+44 20 7659 8564
sean.gammons@nera.com

Richard Druce
Associate Director
+44 20 7659 8540
richard.druce@nera.com

James Grayburn
Associate Director
+44 20 7659 8572
james.grayburn@nera.com

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