Public Private Partnerships

A formula for excess profits and failure

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Preface

PFI, and other forms of public private partnership (PPP) as practised in England and Scotland, are well known to be very problematic concepts. They involve, on the one hand, extremely high rates of return for investors in many schemes – but on the other hand, an unacceptable rate of failure in other schemes. What is less clear is why PFI/PPP has behaved so badly. This note explains why the above characteristics are inherent in the way PFI/PPP has been set up, as a consequence of the very long time periods over which the risk premium in PFI/PPP projects is paid to the equity investors.

Key Points

- The paper explains how paying the risk premium for equity investors in a PFI/PPP scheme over the 30 year life span of the project opens up the potential for equity investors to pocket excess returns immediately after the construction phase of the project – provided construction appears to have been completed satisfactorily.
- This situation is compounded by the extent to which the projected returns to the equity investors are loaded towards the end of the project life: a point whose significance was missed by the public sector when PFI was being set up.
- The paper quotes evidence that the return to equity market investors on secondary market sales of PFI holdings has been a staggering 28% per annum on average.
- But the same mechanism actually also contributes to the high rate of PFI/PPP failure. Paying the risk premium late in the life of the project means that the risk premium is not actually available when it is needed, thus increasing the likelihood of failure if a scheme hits problems.
- There is a further danger, in that the inherent instability in the system risks destabilising the balance sheets of the parent companies which hold PFI/PPP – witness Carillion.

Public Private Partnerships:
A formula for excess profits and failure.

Recent events have graphically illustrated the twin downsides of the UK's experience with PFI and other forms of Public Private Partnerships, (PPPs).

On the one hand, the report by the National Audit Office, (NAO, 2018), highlighted just how expensive PFI contracts were for the public sector. For example, the NAO report quotes evidence that the cost of a privately financed hospital could be 70% higher than the cost of a publicly funded comparator. These excess costs are linked to excessively high returns earned by the equity investors: in another recent report, Whitfield, (2017), quoted evidence that the average **annual** rate of return on the sale of equity in PFI/PPP projects in the UK was a grotesque 28%, (based on 110 transactions in 277 PFI/PPP projects.)

But such high rates of return for the investors in some PFI projects co-exist with a high overall rate of PFI failure. This is the other downside of the PFI/PPP experience as far as the public is concerned. This was brought home most recently by the case of Carillion – whose failure was precipitated by problems in three PPPs in which it was involved. More broadly, the report by Whitfield referenced above recorded how no less than 74 UK PFI/PPP projects have had to be bought out, have been terminated, or have experienced other major problems. Such problems have affected 28% of PFI/PPP projects by capital value. And the additional cost to the public sector has been very large – almost £4 billion and rising.

What the present paper does is to explain the co-existence of these two apparently contradictory features of PFI/PPP, namely, very high costs and profits in some schemes on the one hand, with on the other hand a high failure rate. This is in fact an inherent feature of the way PFI was set up. In effect, this outcome was baked into the very formula for PFI/PPP, when the public sector contracted to pay the risk premium on such projects over an extended, (typically 30 year), period. To see why, the simplest approach is indeed to look at a formula – an algebraic formula which describes the return to PFI investors.

But before getting down to this detail, it is necessary first of all to give some background on "risk transfer" in PFI/PPP schemes, and how the risk takers in these schemes are remunerated. Transfer of risk from the public sector to the private sector is an essential element of PFI and other PPPs. Without adequate risk transfer, the relevant schemes would not be classified, in government accounting terms, as being "off the government's books" – rendering the whole exercise pointless. And, typically, without adding a significant allowance for risk transfer to what it would have cost the public sector to carry out the work itself, PFI schemes would never have given the appearance of representing value for money. Of course, there have always been very grave doubts about the extent to which risk would actually transfer to the private sector: and one of the things which will become clear in this paper is why the substantial extra cost margin in PFI/PPP projects which the public sector pays for risk transfer does not actually provide meaningful insurance against failure.

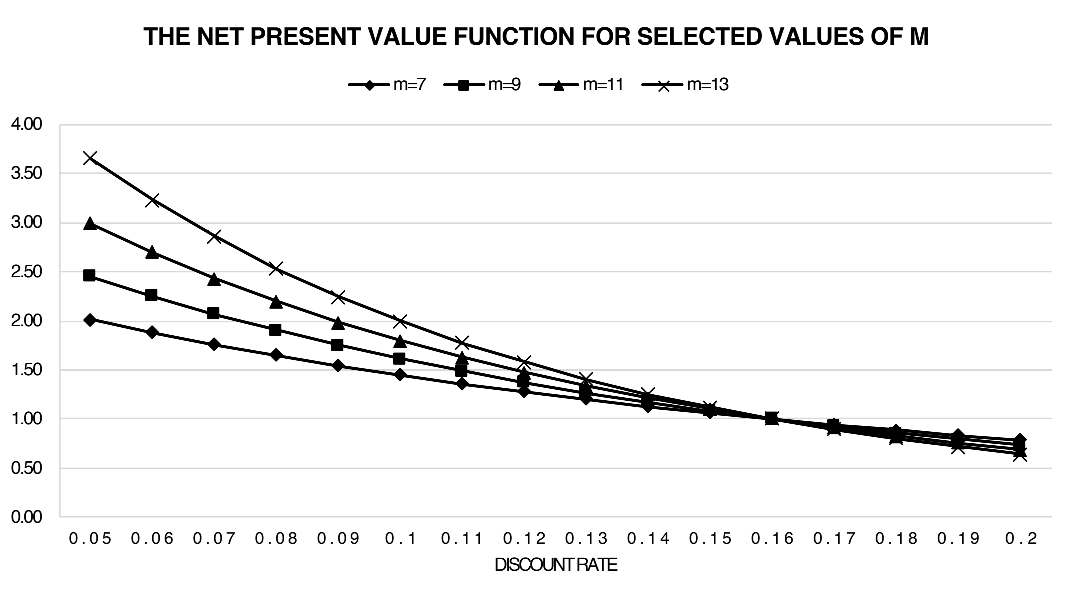
A typical PFI/PPP project is undertaken by what is known as a special purpose vehicle, (SPV): that is, a limited liability company set up for the purpose of undertaking this particular project. Each SPV is usually a consortium of larger companies – very often specialists in areas like construction, facilities management, or project finance. It is these parent companies who put up most of the risk capital for the financing of the SPV – in the form of the equity invested in the SPV. (On a slightly technical note: the equity investors in a PFI or PPP project will normally invest in the project in two different ways. Namely, via subordinate debt, which will earn a high rate of interest: and via investment in equity, i.e., the ownership of the PFI company, which earns the right to take profits as dividends. In this note, "equity" is defined in a broad sense, as covering both types of investment. Note also that in the Scottish non-profit distributing, NPD, variant, there is only a token amount of pure equity – and almost all of the risk capital is in the form of sub-debt.)

The reward to the equity investors in a PFI/PPP scheme comes via the interest payments and repayments of capital on their sub-debt investments, and in terms of dividends paid out on their pure equity stakes. These reward are usually scheduled to be paid out late in the 25-30 year life of a PFI/PPP project. As estimated by PricewaterhouseCoopers, (2008), 75% of the payment to equity investors in a typical PFI will be paid out in the last third of the project's life. There are a number of reasons for this late scheduling of the returns on equity – some good, some bad. For example, the lenders of the senior debt for the project (typically bank debt) which is much less exposed to risk, and receives a lower rate of return, will insist that their loans are largely repaid before the equity holders receive their return.

Rather than waiting 25 or 30 years to realise the returns on their equity investment, the original equity investors in a PFI/PPP scheme will commonly seek to pocket their returns early: e.g., by selling off their equity holdings using what is known as the secondary market for PFI equity. Now, if I am selling a projected future stream of returns to a potential investor, who is looking for a rate of return of x% on their investment, the price the investor will be willing to pay is what is technically known as the Net Present Value, (NPV), of the future stream of returns, calculated at a discount rate of x%. (Only for those who are interested: the technical formula for NPV is given at the end of this note.) So the behaviour of the function describing the NPV of the future stream of equity returns, calculated at different discount rates, is crucial in determining what price the original investors will receive, when they sell their equity stakes in the secondary market.

Because the financial projections for PFI/PPP schemes are usually jealously guarded under a cloak of commercial confidentiality, determining the form of the NPV function for PFI equity is not an easy task. However, it has been possible to obtain the original financial projections for about a dozen PFI/PPP schemes. Examination of the projected streams of equity returns for these financial projections indicates that, over the range of discount rates which are relevant for describing how the secondary market is behaving, the behaviour of the NPV function for PFI/PPP equity is well approximated by the following simple formula. Let ***x*** be the secondary market discount rate (expressed as a fraction: so a discount rate of 8% is expressed as 0.08, and so on). Then the NPV of the stream of equity payments, discounted at discount rate ***x*** is, to a good approximation, proportional to the function $f(x)=(1+x)^{-m}$, where ***m*** is a parameter which will depend on the characteristics of the individual PFI scheme.

It also turns out that the parameter m in the above formula depends on the extent to which the stream of equity payments is weighted towards the end of the life of the project. The more the equity payments are delayed, the larger the value of ***m***. So, to give some real life examples: for a PFI scheme like Hairmyres Hospital, where equity payments were very delayed, the value of ***m*** is over 13. For many other PFI schemes, values of ***m*** between 10 and 12 are common. For two Scottish NPD schemes for which data is available, the values of ***m*** are around 9: This makes sense, since NPD schemes have no pure equity element, so, on average, their broad equity rewards will be less delayed. Finally, for comparison, in the hypothetical case of a flat payment stream of equity rewards throughout the life of the project, the value of ***m*** would be around 7 or 8.



But what does all this mean? How does it relate to the real world? This is where a diagram comes in useful. Consider a typical pre-2008 PFI/PPP scheme where the return to the equity investors (assuming the project goes to plan, and they hold on to their equity stakes until the end of the project) would be around 16% per annum. This is also known as the internal rate of return, or IRR, on equity. And suppose that the equity investors go to the secondary market, and seek to sell their holdings, soon after the construction phase of the project is completed. Then the following diagram shows the function $(1+x)^{-m}$, for a selection of different values of ***m***, where the function has been scaled to take on the value 1 at ***x*** = 0.16 .

What the diagram shows is what multiple of their original capital the investors would get back, if the secondary market buyer was looking for a return ***x***. So if the secondary market buyer was looking for the same return as the original project IRR, that is, ***x*** =0.16, then the sellers would get their original capital back. (Actually, what the sellers would get would be their original capital, uprated at 16% per annum for the period between the original investment and the sale: which would be a pretty healthy return in its own right. For present purposes, this initial return element is neglected here – but should not be forgotten).

What is really interesting is what the secondary market valuations are at values of ***m*** different from the original equity rate of return. So, if an equity investor in a project with an ***m*** value of 7 sold their equity stake to an investor looking for an 8% return, then they would receive back 1.65 times the capital they invested. But an ***m*** value of 7 is unrealistically low. For a more typical value of ***m*** for a PFI project, say 11, the original investors would get back 2.19 times their original stake, on a sale to a buyer looking for an 8% return. And if the value of ***m*** was 13, the multiple would be 2.53.

Is it likely that there would be buyers in the secondary market, willing to buy PFI/PPP equity stakes at discount rates so much lower than the original equity IRR? The answer is yes – provided that the construction phase of the project has been completed satisfactorily (or appears to have been completed satisfactorily). The major risks with a PFI type project are generally regarded as falling within the construction phase. So once construction has been completed, on time, and without any hitches becoming apparent, and once the public sector client has started making its regular unitary charge payments to the SPV, then the projected stream of payments on equity will be an attractive investment. It will be particularly attractive to an investor, like a pension fund, who is looking for a moderate return on a safe investment.

So what the diagram illustrates is how, on successful completion of the construction phase in a PFI/PPP, equity investors could well get returns in the secondary market equivalent to two or three times, or more, of the capital they originally invested. These are breathtaking rewards – but are very much in line with the scale of returns actually observed in the secondary market. And although the diagram, with an original equity IRR of 16%, illustrates the situation pre-2008, the lower interest rates since then have not materially altered the situation. To give an example: the PPP projects under the Scottish Futures Trust hub programme have an equity IRR of around 10.5%: But it was still envisaged, when some councils were considering investing in the sub debt of their own hub projects, that secondary market sales might earn a multiple of 2.7 times the capital originally invested: see, for example, the report (Aberdeen City Council, 2015).

The magnitude of the rewards which would become available in the secondary market to holders of PFI equity was not foreseen when PFI was being developed – because the public sector did not look in sufficient detail at the relevant financial projections. Partnerships UK, the body set up to facilitate the development of PFI, assumed that all of the payment streams in PFI projects would be of a flat, mortgage, type. What was missed and, indeed, initially denied, was the extent to which equity returns were weighted towards the end of the life of the relevant project. As the diagram indicates, even if payment streams had indeed been flat (which would correspond to the lower, m=7, curve in the diagram) the potential rewards on secondary market sales would indeed have been generous. This in itself is a consequence of the long time period over which returns are going to be paid: even a flat payment stream will have an NPV function with a more pronounced downward slope, the longer the period over which the payments will be made. But the additional rewards available because of the end loading of equity payments, (meaning that the relevant curves in the diagram are the upper higher ***m*** value, curves) meant that the scale of potential rewards became truly grotesque.

So the algebra outlined here explains one side of the bad PFI coin – the excess returns available to the original equity investors in some PFI schemes. But actually, the same algebra explains the other side of the coin as well – the propensity for PFI failures.

Suppose that, during construction, or soon thereafter, a PFI project hits problems like delays or flaws discovered in the building. Then one thing that is certain is that this is going to cost the SPV money now, over and above what has been budgeted for. But the financial premium the public sector is paying for the transfer of risk is not available now – it is scheduled to be paid, as has been seen, much later in the project life, in the form of the return on equity. And a project which is already suffering from problems is not going to be an attractive investment for a secondary market investor who is looking for a risk free investment. So the option of realising the future returns now, by a sale of equity in the secondary market, will not be available. In terms of the above diagram, if any secondary market sale is possible (which it may well not be) the buyer will be looking for a sufficiently high rate of return to compensate for the high degree of risk involved. In other words: Any secondary market sale is likely to take place towards the right of the figure, probably at a value of ***x*** greater than or equal to the original equity IRR – and so getting only a fraction of what would be available from a non-distressed sale.

And similar logic implies that, if the SPV for a PFI/PPP project which is in trouble wants to raise finance by borrowing to bail out the project, then the terms on which it will be able to borrow will be similarly disadvantageous.

So, what has been set up in the shape of PFI/PPP is a doubly perverse mechanism. When things are going well (or appear to be going well) it is a system which delivers very large financial returns to the equity investors – potentially delivering to them multiples of the capital they originally invested in just a few years. But if things go badly, the financial premium which the public sector has contracted to pay for risk transfer is not actually available to the SPV when it is needed – greatly increasing the likelihood of the project failing.

In fact, there is a further layer of instability built into the system as well, because of the effect of PFI/PPP holdings on the balance sheets of the equity owners themselves. Under present accounting rules, companies account for such assets on what is called a “mark to market” basis: That is, assets appear on their balance sheets at the value the asset would realise if it were sold in the market. The accounts of Carillion for 2016, for example, noted that such assets were classified as “available-for-sale financial assets and are recognised at fair [that is, market] value.” So as long as a PFI/PPP project is going well, the valuation of the equity holding in the equity holder’s balance sheet will be at the high values to the left of the above figure. But as soon as there are problems, the valuation will collapse, sliding down towards the right of the figure, or even lower. So the combination of “mark to market” accounting, and the slope of the NPV function in the figure, represents an infernal machine which is capable of blowing an instant hole in the balance sheet of a parent company (like Carillion) – a hole which is potentially multiples in size of the capital which the parent company has actually invested in the PFI/PPP scheme. It is precisely this mechanism which played a large part on the collapse of Carillion. According to reports, as Carillion collapsed last year, £375 million of the hole which suddenly emerged in its balance sheet arose from writing down the value of its equity holdings in PFI/PPP contracts.

So what we have with PFI/PPP is a system which, in many ways, delivers the worst of all possible worlds – high costs to the public sector, and the potential for grotesque profits for the private sector, together with poor risk transfer and the danger of destabilising the balance sheets of the parent companies.

There was no need for the system to be set up embodying these disastrous features. The flaws outlined above arose from a combination of woolly thinking, and the lack of care typical when neo-liberal dogma is substituted for careful analysis. In particular:

- The basic point was missed that paying equity investors enough to persuade them to invest in a (moderately) risky venture is not the same as insuring against failure. The public sector is still, all too often, left carrying the cost of failure.
- There was a failure to recognise that the risk premium being paid to the equity investors would not actually be available to them if, and when, it was needed. If the primary risks in a PFI/PPP scheme occur during the construction phase, it makes no sense (indeed, it is counter-productive) for the public sector to contract to pay the resulting risk premium twenty or thirty years later.
- There was the failure to recognise that the long time periods over which unitary charges are made under PFI/PPP opened up the potential for huge profits to be realised in the secondary market for PFI/PPP equity. The longer the time period over which payments are made, the more sensitive the Net Present Value function (as depicted in the diagram) will be to variations in the secondary market discount rate. And, in fact, there was no good, intrinsic reason for these long time periods; they simply came about as part and parcel of the arrangements to get PFI schemes "off the books" of government.
- And finally, the previous point was compounded by the heavy-end loading of the projected equity returns in PFI/PPP schemes, a point which was not anticipated or detected by the public sector.

All in all, the history of PFI/PPP is a sorry tale of how not to develop public policy. And tinkering with PFI – as in the PF2 variant in England or the Scottish NPD and hub models – does not get round the fundamental problems inherent in the public sector contracting to pay for risk capital over a thirty-year time horizon.

The definition of Net Present Value

Let $a_1, a_2, \ldots, a_n$ be a sequence of returns over the periods 1,...., n. Then the net present value, NPV, of this sequence. calculated at discount rate x, is defined to be

$$\text{NPV} = \sum_{j=1}^{n} a_j (1+x)^{-j}$$

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