Financial Markets and Financeability:
The Implications of Recent Developments for Utility Regulation

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Abstract

Utilities face a serious underinvestment problem that threatens the viability of price cap regulation and the private provision of utility services. A number of solutions have been proposed, all of which have significant problems associated with them. Meanwhile, the failure of financial systems has important lessons for the regulation of the utility sector as well as significant consequences for their cost of capital. Again solutions have been proposed that have serious drawbacks to them. Instead, it is suggested that the ring-fencing of core utilities and deposit taking institutions from other activities is required, not just to avoid rent transfer to the detriment of customers but also to prevent rent extraction to the detriment of investors. When combined with greater consistency in the determination of the cost of capital and regulatory asset valuations then it is possible for both regulators and governments to commit to long-term corporate investments. The paper makes three policy proposals. There should be a statutory independent body to determine the framework for financial regulation of utilities; there should be a floor as well as a cap to the return that utilities are able to earn at regulatory reviews; and there should be ring-fencing of core activities in banking as well as utilities.

Key words: Utilities, regulation, banking, investment, commitment

1 Introduction

The August 8th 2009 Edition of the Economist had as its UK front cover headline, "How Long Till the Lights Go Out?" The accompanying article pointed to the shortage of investment in new capacity and the grid. A previous article in the Economist was entitled "Hemmed in at Heathrow" (May 27th 2008) and highlighted the lack of investment in airport terminals and runways. A third article talked about "Britain's trains rank(ing) alongside its weather as a standing national joke" (December 18th 2008).

This lecture series comes at an opportune time - 25 years after the first privatisation of British Telecom in 1984. It is difficult to argue that we are still fine tuning privatisation and regulation and that these are just teething problems which will shortly get fixed. There is something fundamentally wrong with utilities and infrastructure in Britain. It is not that they have failed to deliver benefits. There have been marked improvements in efficiency and reductions in operating costs across many sectors which have been reflected in lower charges to customers. The problem is investment. There is an underinvestment problem that privatisation has failed to resolve and, on the contrary, may have seriously exacerbated.

As the Economist article about electricity indicates, the problem is becoming acute. Until now, privatisation has been able to live off the benefits of efficiency savings in passing through falling costs to customers. The consequences of underinvestment have not been apparent. But they are now coming home to roost and unless action is taken swiftly we will face decades of declining services and rising bills.

A second reason for addressing this issue now is the financial crisis. This country has just been through the most serious failure of its financial system possibly ever and certainly since WW2. It is probably the most manifest form of the consequences of regulatory failure that we have had to date and it has important lessons for the utility sector. Some have suggested that banks, at least their core deposit taking business, should be treated like utilities; others have argued that utilities should be treated like banks or bonds. But neither at present look like models for each other.

The article begins in Section 2 by determining the nature of the problem. It suggests that there are fundamental deficiencies with our regulatory system that lie at the root of the investment problem. In Section 3 it then considers some of the proposed solutions to the problem and argues that there are deficiencies with all of them. Section 4 discusses the financial crisis and the lessons to be learnt from it. Section 5 proposes an alternative way forward and Section 6 concludes the article.

2 The Investment Problem

The method by which utilities are regulated and price caps are determined is by now familiar. While there are specific variations across sectors, broadly the process is as follows. An asset valuation is determined by rolling forward initial valuations at the time of privatisation, depreciating it and augmenting it for new investment and price increases. This creates a Regulatory Asset Base (RAB) that is the basis of the net profit that utilities are allowed to earn on their investments. To this a cost of capital is

applied to determine the anticipated profit. An estimate of efficient level of operating expenditures is then added to this to establish the revenue that the firm should be allowed to earn. With a projection of demand, a price cap can be calculated that is set for the relevant regulatory period (frequently five years).

These projections are subject to a financeability check. Estimates are made of the likely future financial ratios of firms (interest coverage, leverage, liquidity and cash flow) to ensure that they are able to finance their functions. Where there is a risk of failure on this score then headroom can be built in to the projections to allow a margin above the required rate of return.

Put simply, the RAB is an accounting scheme for logging up investments and attaching a current value to them, the cost of capital ensures that they are just fairly rewarded for the regulatory period, and a sensibility check is applied to ensure that the resulting projections are reasonable in relation to the financial condition of the firm.

It sounds straightforward and robust and it has a lot of appeal in relation to the most commonly applied alternative, rate of return regulation, which differs from the above in adjusting the price cap continuously to bring returns back into line with the cost of capital. By setting prices for an extended period of time (the regulatory period), firms have incentives to try to beat the projections of capital and operating costs made at the start of the period.

And that is the first source of problems with the UK system.

The Knife Edge Problem. In a competitive market, firms face a demand for their services that determines the returns from different levels and types of investment. They undertake investments that are anticipated to earn returns in excess of the cost of capital and continue investing to the point at which on the margin the anticipated rate of return is just equal to the cost of capital.

A regulated firm undertakes two types of investment. Non-discretionary investments are those that are specified as part of the regulatory contract or licence. They relate to activities and service provision that firms are required to offer. The second type are discretionary that might assist the utility with reducing costs through, for example, the installation of new IT systems in headquarters, and enhance the quality or volume of services that the firm is offering its customers, for example, the building of a new airport terminal or upgrading of an existing one.

In the case of non-discretionary investments, an allowed return in excess of the cost of capital is essentially a windfall for the utility and an insufficient allowed rate of return is a penalty. The valuation of utilities around regulatory review periods is sensitive to the market's assessment of whether firms will be allowed to earn a return that is greater than or less than their actual cost of capital. One way of judging this is to compare the market's valuation of the firm with its regulatory asset value. In principle the two should be equal at the start of the regulatory period and deviations suggest a misalignment of allowed rates of return and actual costs of capital.

The impact on discretionary investment is more serious. As noted above, in the competitive private sector, returns are determined by the market. In the regulatory

sector, the regulator sets the allowed return. An error in this does not just have distributional consequences in terms of the benefits to shareholders versus customers but in relation to the firm's real level of activity. If the allowed rate of return is in excess of the actual cost of capital, firms have incentives to do as much discretionary investment as possible and if the allowed return is too low then they avoid undertaking more investment than they have to.

The knife edge problem then is that a small error in the estimated cost of capital can have large and unintended consequences for the real scale and quality of services delivered. One response is clearly to limit the degree of discretion that firms have and in large part that is exactly what has happened. Regulators have become increasingly prescriptive in terms of capital expenditure programmes that firms are required to undertake.

The second approach is to shorten the period for which the price cap is set so that the cost of capital can be reset in line with actual returns. Again that is essentially what has occurred through the application of interim reviews. The more frequent the recalibrations the closer a price cap form of regulation tends to rate of return regulation and that is why the knife edge problem is much more a feature of the UK than the US regulatory system.

Commitment The last lecture in this series that I gave was in 2004 about the water industry.[1] I pointed out the problem created by the regulatory cycle in water. In the early days of privatisation the emphasis was on promoting investment and allowing companies to reverse the decades of underinvestment which had occurred when it was in the public sector. Allowed rates of return were generous and firms were regularly exhorted to take more debt on their balance sheets.

That was all changed in the 1999 review. Following years of price increases to fund capital expenditure programmes, the 1999 water price review sought to bring average household bills down to their levels in the early years after privatisation. Rates of return dropped from 9.3% to 6.6% in one year between 1999/2000 and 2000/1 following an average P_0 cut of 12.3% and were projected to fall below that thereafter. The subsequent turn of events was not what Ofwat anticipated. In short succession in 2001, Sutton and East Surrey, Mid-Kent and Glas Cymru announced leveraged buy-outs, recapitalisations and acquisitions with proposed leverage levels in excess of 75%. They were in turn followed by Anglian Water, Dee Valley Water, Portsmouth Water, Northumbrian Water, Southern Water and South Staffordshire Water proposing recapitalisations and buy-outs with leverage levels between 70 and 90%. In a short space of time, more than 35% of the assets of the water industry were in highly geared companies (with leverage in excess of Ofwat's assumed range of 45-55%).

One of the main drivers for this dash for debt was the marked reduction in the cost of capital. In the first decade of privatization, rates of return were sufficiently generous to allow companies to finance their activities from equity – retained earnings rather than new equity issues. With the tougher regime imposed by the 1999 review, firms

[1] "Commitment and Control in Regulation: The Future of Regulation in Water", Colin Mayer (2005) in *Governments, Competition and Utility Regulation* ed. Colin Robinson, Edward Elgar.

were forced to seek cheaper forms of finance and they attempted to do so by taking advantage of the tax deductibility of interest payments on debt. They also saw leverage as a way of deterring the regulator from imposing further reductions in allowed returns.

The problem that this regulatory cycle reflects is the one that I highlighted in my 2004 lecture of regulatory commitment. During periods of high capital expenditure requirements, regulators seek to promote investment by offering high rates of return. However, once the capital is sunk then there are strong political forces encouraging regulators to claw back as much as possible by offering lower rates of return. Even if they feel compelled to follow rules that prevent that from happening, they cannot bind their successors and there is therefore no way in which the regulatory system can provide long-term commitments to firms about allowed rates of return.

In the absence of long-term contracts (implicit or explicit), firms are discouraged from undertaking long-term investments. In addition to the knife-edge problem of under or over investment, firms tilt their discretionary investment in the direction of short-term activities to match the duration of regulatory periods for which returns are assured. There is therefore excessive investment in short-term projects and inadequate investment in long-term activities – the short-termism to which inadequate commitment gives rise.

In regard to non-discretionary investments where firms are unable to choose their capital expenditure programmes, the problem is even more serious because firms are encouraged to invest as little of their own capital as possible. They raise little or no external equity finance and pay out as much of their retained earnings as possible to shareholders. This has a pronounced effect when, as in electricity and water, there is a duty on the regulator to ensure that companies can not only earn a reasonable return on their investments but also finance their functions. This financeability condition imposes a requirement on regulators to undertake projections of firms' cash flows and capital expenditure requirements and ensure that companies are generating sufficient funds to cover their obligations.

If companies have little incentive to raise external equity finance and strong incentives to pay out retained earnings as dividends then either leverage increases, as we observed above in water, or the whole principle of external financing of investment breaks down and customers have to pay for capital as well as current expenditures. That is precisely what a combination of lower rates of return, an absence of regulatory commitment and the financeability requirement have done. They have pushed regulation in the direction of cash flow funding by customers and away from external financing by investors.

In sum, the combination of the knife edge and the commitment problems has meant that we have ended up with a regulatory system that is increasingly rate of return rather than price cap, encourages corporate short-termism and is funded by customers rather than investors. It is a far cry from the light touch regulation that motivated privatisation and was expected to allow regulation to wither on the vine. Instead of regulation withering, it is corporate investment that is in decline and the problems that I described at the outset are a manifestation of that.

3 Proposed Solutions

A number of solutions have been proposed. Clearly we could move over to rate of return regulation. However, there are well known problems associated with that in terms of gold plating and capital expenditure inefficiencies.

Indexing the cost of capital: The first solution that has been proposed is to index the cost of capital and in particular the riskless rate of return. The cost of capital is constructed from a combination of projections of yields on government securities and corporate debt and equity premia above these riskless returns. Over a regulatory period there are significant variations in these returns and premia set at the beginning of the period may be inappropriate at the end.

As noted above, variations in allowed from required rates of return have serious consequences for investment incentives. A small error in predicting the cost of capital can have substantial effects on aggregate expenditures. An obvious solution is to index the cost of capital to actual rather than predicted interest rates and premia. In the case of yields on government securities and corporate debt premia this is easy to do. They are observable and directly measurable. In the case of equity premia, it is harder because there are no current observable measures. Equity premia are typically estimated from long-runs of data.

One suggestion[2] is to index at least the debt component of the cost of capital; that way fluctuations in interest rates would be eliminated as a source of inaccuracy in the cost of capital. Indexing can also be used to enhance regulatory commitment because it moves the determination of the cost of capital away from a discretionary process to a rule based system. If regulators set the cost of capital and then simply update it as interest rates and margins on corporate debt change then room for altering the cost of capital is diminished and regulatory commitment is increased.

Attractive though this sounds there are two problems with it. The first is that if the equity risk premium is unobservable then indexing debt can increase rather than diminish the error in the overall cost of capital. If the equity risk premium is approximately constant or independent of movements in the cost of debt then indexing debt is beneficial. But if the equity risk premium is inversely related to the riskless return then just adjusting the riskless return can make matters worse rather than better. In some models the inverse relation is a plausible description if equity returns are for example independent of returns on debt.

The second problem is that in regard to non-discretionary investment, the only effect of indexing the cost of capital is to transfer rate of return risk from investors to consumers. If capital expenditure is invariant to allowed rates of return then indexing merely passes through fluctuations in the cost of capital to consumers from investors. In general, investors are better placed to hedge risk or are less risk averse than consumers so that the transfer of risks is welfare diminishing.

[2] See for example, Richard Brealey and Julian Franks (2009) forthcoming in Oxford Review of Economic Policy issue on Infrastructure.

In sum, the effect of indexing on discretionary investment could be perverse and on non-discretionary investment could be welfare diminishing, so overall it is not clear that it is beneficial.

Split cost of capital: A second proposal recognizes the commitment problem and suggests that it should be faced head on by separating the regulation of new investment from existing assets.[3] At present all assets are lumped together. Under this proposal, new capital expenditures should be treated as high risk activities and earn corresponding returns. Existing assets should be viewed as low risk investment and treated as bonds. This solves the commitment problem by recognizing that in the long-run assets will not earn above a low return and can only be expected to generate high returns in the short-term.

Again this is superficially attractive but there are at least two problems with it. The first is a purely practical problem of measurement. We observe the riskiness of firms but we cannot measure the riskiness of assets. Therefore while we can measure beta coefficients of companies (new investments and assets in place) we cannot measure the beta coefficients of the new investments alone. Indeed, if we account for one of the main costs of new investment, namely the loss of an option to defer then the measurement of the cost of capital can be seen to be even more complex. As the case of the building of Terminal 5 at Heathrow illustrated, one of the main costs of new investments is the loss of an option to defer to a point at which uncertainty about levels of demand is resolved. These options to defer are notoriously difficult to measure with any degree of precision.

The second problem is more fundamental. The cost of capital of new investments is in general greater than that of assets in place. Companies required rates of return are therefore relatively high during expansion or replacement periods and decline during lower growth periods. If costs of capital are separated out between new and existing assets there will be inter-temporal and inter-generational consequences. At present costs are spread between high and low growth periods. Essentially, customers in low growth periods subsidize customers in high growth periods by being charged in excess of the actual cost of capital in relation to that during high growth periods.

One of the reasons why the commitment problem arises is, as noted above in relation to water regulation in the UK, it is difficult for regulators and governments to sustain the cross-subsidies during low growth periods. The case for the inter-temporal cross-subsidy is essentially an insurance one. We would wish to be able to pre-commit to systems that allow us to inter-temporally smooth. For example if, as the start of this article suggest, we are about to enter into a period of high investment requirements across several sectors of the economy then we would want to be able to smooth the burden across periods when there are more modest investment requirements. So even if we could measure the difference between the cost of new and existing assets and incorporate them in split costs of capital, we might not wish to do so.

There are therefore objections to as well as merits in both indexation and the split cost of capital. But the fundamental concern that they raise is that they both fail to address the underlying issue. This is not solving for the short-run inter-periodic review

[3] See Dieter Helm (2009) forthcoming in Oxford Review of Economic Policy issue on Infrastructure.

fluctuations in the cost of capital. It is not how to front load returns and cash flows on investments. It is not how to increase the debt component of firms' asset base and index its return. It is on the contrary how to solve for the protection of long-run value and returns of investments and in particular the equity base. To date a resolution of this problem has not been forthcoming. Before we turn to one, let us briefly digress to recent events in financial markets which, though at first sight they may appear tangential, are actually directly relevant to the regulation of utilities.

4 The Financial Crisis

We have just been through the ultimate experiment in deregulation which nearly brought the world's financial system down. Freed from the restrictions of regulation, banks moved into relatively high risk markets and securitized their loans to a degree that subsequently threatened the monetary system.

The securitization of debt involved a fundamental shift in the activities of commercial banks as deposit taking institutions to becoming asset backed traders of securities. By being able to package loans and at least partially take them off their balance sheets through securitization, banks were able to fund their activities through sales of portfolios of loans. Instead of being dependent on deposits from either the retail or the wholesale sector, banks could increasingly fund their activities from bond market trades. Essentially the separation between commercial banking dealing in deposits and investment banking dealing in securities was eliminated.

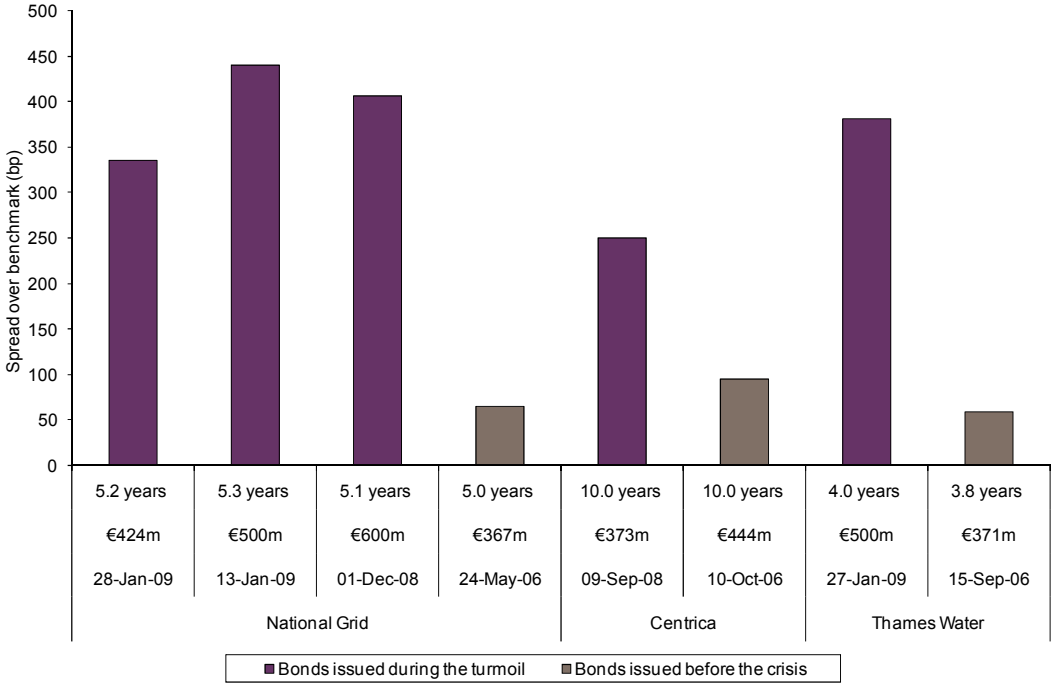
In principle, this expansion in commercial banking is beneficial in extending the amount of activity commercial banks can undertake and spreading risks that are otherwise concentrated in particular institutions. Regulators and central banks alike welcomed this activity as a method of dispersing risk through the financial system. The volume of activity increased and banking became more competitive.

The utility sector benefited significantly from this as the margins on loans diminished to very low levels. The ability of utilities to securitize their own balance sheets had a lot to do with the commercial banks being able in turn to pass on their loans to the rest of the financial system. Financial innovation in banking encouraged financial innovation in the utilities. Tightened regulation in the utilities found its outlet through deregulation in the banking sector and the lower costs of capital that utilities were required to deliver were provided by the more competitive banking system.

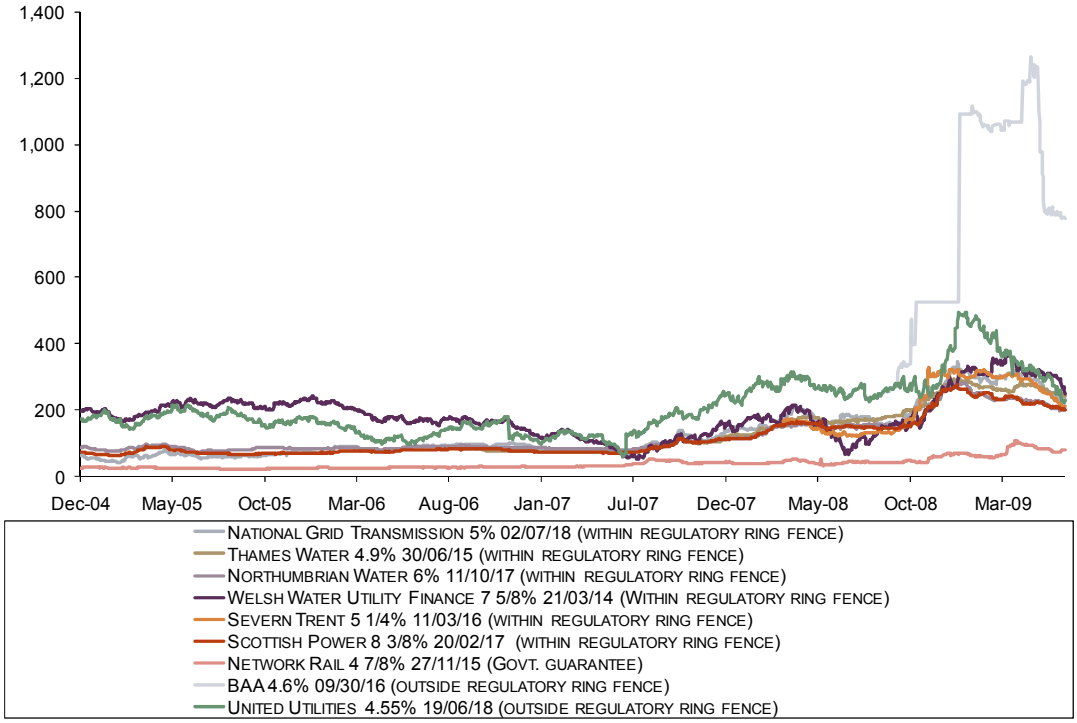
The problem was precisely the apparent attraction of the development. The spreading of risks caused the interconnection between financial institutions to grow to a degree that no one including the central banks understood. The effect was that there was no appreciation of who bore the costs of relatively minor failures in one part of the financial system for investors elsewhere. In other words, the consequence of securitization was to increase the degree of asymmetry of information between different financial institutions and between regulators and financial institutions appreciably. A small disturbance could and did have a dramatic effect because its impact on the solvency of other institutions was unknown. In the presence of serious asymmetries of information credit rationing occurs and price mechanisms fail. That is precisely what happened.

So the subsequent failure of the financial system reversed the benefits to utilities of falling costs of capital. The margins on corporate debt rose appreciably and firms were prevented from accessing the loan market. The figures below report some of the dramatic changes in spreads that occurred in utilities.

Launch Spreads on Utilities Pre- and Post-Financial Crisis



Debt Spreads for Selected Utilities



These graphs illustrate the substantial variations in the cost of debt that can occur in the short run. To the proponents of the indexation of the cost of capital, they provide a stark affirmation of the importance of protecting firms from these unanticipated, unavoidable variations in the cost of capital. To the opponents, they do exactly the opposite because while the variation in the cost of debt is all too evident from these graphs, the variation in the cost of equity is not. The conventional view would be to assume that the equity premium was unaffected and that the equity cost of capital should be adjusted by the same amount. Observations on the volatility of equity prices would suggest that if anything this understates the associated increase in the required return on equity. On the other hand, the fact that the underlying failure was in the credit not equity markets points to a decoupling of required returns in the two markets. Indexation would have given rise to substantial short-run movements in utility bills; a split cost of capital would have made these even larger by raising the debt proportion of the overall asset base. And none of this would have had much of an effect on utilities' capital expenditures.

A number of solutions to the widespread failure of banks have been proposed. One is that we should turn banks into money market funds and allow the value of deposits to fluctuate in line with the value of financial securities in which the funds invest. A second is to convert banks into utilities and require them to invest in safe assets, such as Treasury securities – what is sometimes called "narrow banking".

There are deficiencies with both these proposals. Risk-averse investors prefer to hold their monies in assets of known value and the price of transactions is increased by raising uncertainty regarding the value of assets held by the counterparties with whom they trade. For example, during the recent crisis the value of many formerly liquid securities became uncertain and the payment system would have been further threatened if the solvency of counterparties was made still more questionable by uncertainty regarding the value of their deposits.

Narrow banking is repeatedly proposed after financial crises and bank failures but is repeatedly rejected.[4] The reason is that it diminishes the value of the function performed by banks. A primary role of banks is to engage in liquidity and maturity transformation. They take in short term liquid assets that depositors value for settling transactions and convert them into long-term risky and illiquid investments that borrowers value for funding correspondingly long-term assets. If they did not perform that transformation function and instead invested in safe liquid treasury securities then the cost of borrowing for those who depend on bank loans would rise significantly. In particular, banks play a critical role in the funding of small and medium sized companies that otherwise have little access to capital markets. If banks were forced to restrict their investments to safe marketable securities then the cost of small company borrowing would rise and the already limited market for small company loans would become even more restricted.

Reliance on neither mutual funds nor narrow banking provides a resolution of the banking crisis. Nevertheless, commercial banks have been allowed to expand their

[4] See John Kay (2009), "Narrow Banking: The Reform of Banking Regulation" http://www2.johnkay.com/papers/JK_NarrowBanking.pdf for the latest such proposal.

range of activities in a way that has significantly increased the degree of opacity in the financial system. Risk spreading is inherently good but only if the allocation of risks is known. A critical condition for the merging of commercial and investment banking is transparency regarding the nature of investments, and knowledge about who bears risks and the consequences of failures in one part of the financial system for the losses sustained elsewhere. In its absence, a tighter delineation between insured and uninsured parts of the banking system is required.

5 A Regulatory Resolution

Regulation succeeds if the regulators succeed. We are dependent on the quality of our regulatory institutions and processes for ensuring that our regulated institutions perform appropriately. By regulatory success we mean promoting long-term investment in utilities which requires economic regulators to display long-term commitment. Without it there are no rules that will be sufficient to bind regulatory bodies not to interfere and behave opportunistically when it appears politically astute to do so.

There are changes in practice that can encourage greater commitment. For example, it is extraordinary that, 25 years after the first privatization, we are still determining the cost of capital at each price review as if we were doing it for the first time. It is wonderful for regulatory organizations, for economic consultancies and for those working in the regulatory departments of utilities but it is lousy for investors and customers. It increases uncertainty about the outcome of reviews and facilitates precisely the regulatory opportunism which undermines commitment and credibility.

There is insufficient innovation in the determination of the cost of capital to justify this continuous reinventing of the wheel. We should have a common method of determining the cost of capital across all utilities which sets out the formulae and the way in which data are collected. If there are to be changes in the process then they should be subject to review by a statutory independent panel, not dissimilar to the monetary policy committee in relation to interest rate setting. Likewise the determination of the RAB should be routine. There should be a clear basis for establishing which assets are to be included and excluded, and how they should be valued and re-valued.

Eliminating uncertainty about the determination of the cost of capital and the RAB would go a long way to enhancing regulatory commitment. But there is a still more serious reason why stability and predictability in the determination of the RAB and the cost of capital are important. Utilities are not only exposed to rent grabbing by regulators but also by governments. This may not be done directly but surreptitiously through adjacent policy decisions: road policy impacts on the returns to railways; environmental policy has a major effect on airports; nuclear policy impacts on gas; even if water standards are set for an extended period of time, industrial pollution policies affect the cost of companies meeting those standards.

Uncertainty is inherent in any system and uncertainty resulting from changes in public policy is unavoidable. It is not even necessarily undesirable in so far as financial markets can absorb and diversify those risks. What is damaging is the systematic

exploitation of sunk assets, namely a failure to sustain the returns due to past investments. This has a serious effect on incentives to undertake future expenditures.

If we want to have utilities that undertake long-term investments in an efficient way and allow the costs and benefits to be shared equitably between generations, we need our regulatory organizations and political institutions to display a degree of commitment that they have failed to demonstrate to date. And the RAB and the cost of capital can do that if they are viewed as setting not just a ceiling but a floor to rates of return over long periods of time. If a new motorway reduces demand for services on a rail line and if environmental standards raise costs of delivering services then there should be compensating price adjustments to sustain returns in the long term. Not only therefore should there be greater certainty about the setting of both costs of capital and the RAB but they should define a floor as well as a ceiling to returns at regulatory reviews. There should be a statutory requirement on regulators to ensure that the market value of utilities is in line with their RAB at regulatory reviews.

The RAB and the cost of capital can therefore become important commitment devices. But for this to be a credible policy, it must be against the protection of assets and investments that are socially as well as privately valued. Ring fencing is generally regarded as a way of preventing companies from extracting benefits from utilities for other parts of corporate groups. But likewise it allows the regulatory system to ensure that returns on utilities are retained while avoiding spillovers to other activities. Thus returns to a narrowly defined water company can be sustained in a way in which they cannot for a broader defined group.

Recent experience in banking provides a stark reminder of the cost of failing to do this. One of the most serious objections to the banking subsidies that have cost taxpayers dearly, particularly in Britain but elsewhere as well, is not that they have sustained commercial banking but they also subsidized non-commercial banking activities. It was impossible to write down the value of bonds in failing banks because they would have as much threatened commercial as other banking activities. What lies behind the notion of "a living will" is that in the event of financial failure it should be possible to extract core banking from the rest. More generally, the subsidy that comes from deposit insurance should be used to protect the core components of commercial banking that are critical to the functioning of an economy rather than others that can perfectly well be provided by non-deposit taking institutions.

Identifying what should be inside and outside the ring fence is critical. This is now well defined in utilities – ring fences are for the most part clear and effective. In contrast in banking they are far too inclusive of activities that are not critical to the core functions of banks and narrow banking proposals are too restrictive. The appropriate boundary is between the conventional commercial activities in providing loans in particular to small and medium sized companies and individuals and investment banking – along the lines of the Glass-Steagall Act in the United States which very effectively protected the US banking system for 60 years before its repeal a decade ago.

Associated with the size of the ring fence is the "span of regulation". In the absence of sufficiently tightly defined core utilities then the required span of regulation is too great. In principle, bank regulators could have measured the systemic risks associated

with the new financial instruments and asset-backed activities of banks. In practice, they did not have the tools with which to do this. So regulation failed because its required span was excessive. Likewise, the regulators of utilities could in principle determine the spillovers and rent transfers to other activities but in practice it is almost impossible for them to do so.

There is a general principle of public goods and services which underlies these assertions and that is the private provision of such activities requires three things: first, the clear delineation and separation of these from other functions; second, the determination of long run required rates of return; and, third, accepted principles of asset valuations. The deficiencies of regulatory failure in banking and utilities are mirror images of each other. In utilities, ring-fences are well established; in banking they are not. In banking, the valuation of protected assets, namely deposits, is well defined and their required return, a debt cost of capital, is easy to measure. In utilities, both the valuation of assets and their required return are complex, in light of their equity and long-term components.

Banking should therefore learn from utilities in erecting well defined ring fences. Utilities should learn from banking in establishing floors as well as ceilings to allowed returns and ensuring that the valuations of these are clear and contractual. If they can learn from each other, then a basis will be provided for the sustainable regulation of both.

6 Conclusion

In this article I have argued that we are facing an investment crisis in the utilities and infrastructure more generally that requires a concerted effort to promote more stable long-term investment programmes. I have suggested that there are two fundamental sources of under-investment in the utilities – a knife edge and a commitment problem. The knife edge problem encourages a shift towards rate of return away from price cap regulation and the commitment problem leads to under-investment and excessively short-term investment.

Indexing the cost of debt and split costs of capital have been proposed as solutions but suffer from possible distortions and measurement difficulties and could be welfare diminishing rather than enhancing in imposing risks on those who are least suited to bear them and preventing desirable intergenerational smoothing of costs and benefits from occurring. More fundamentally they both fail to address the protection of the long-run return on equity capital.

The financial sector illustrates the importance of ring-fencing. Deregulation of the financial sector encouraged financial innovation that lowered costs of capital and increased availability of finance for firms including utilities. However, failure to recognize the resulting systemic risks created informational problems that then dramatically raised the cost of capital and caused credit rationing. Again a number of solutions have been suggested which diminish the maturity and liquidity transformation functions of banks but thereby undermine the social value of their activities. Instead, ring fencing of core deposit taking functions of commercial banks from others is required to allow public provision of insurance and protection against systemic risks of failure.

Ring fences in utilities are comparatively well defined. However, utility regulation, unlike bank regulation, does not provide adequate asset protection. As important as the avoidance of monopoly exploitation is the protection of sunk investments exposed to political as well as regulatory interventions. The cost of capital and the RAB together offer the potential to do this as part of a regulatory floor as well as ceiling. The continuing success of private provision of utility services makes it essential that this element of commitment and security of returns is available to firms over the long term.