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Current Cost Accounting: Its Role in Regulated Utilities

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I. INTRODUCTION

Current cost accounting (CCA) was an important issue in financial accounting in the 1980s. In the UK, an accounting standard (SSAP 16, 1980) required supplementary CCA disclosures by large companies, but widespread non-compliance led to its being made non-mandatory in 1986 and completely withdrawn in 1988. The forces behind this failure were partly a decline in the rate of inflation, which made the effects of changing prices less important, and partly changes of government policy which meant that tax reliefs were not given on the basis of CCA and CCA was no longer needed as a means of justifying price increases.² The US had a similar experience, a standard requiring CCA disclosures (FAS 33) being introduced in 1979 and withdrawn at about the same time as the UK standard.

Since the withdrawal of SSAP 16, UK financial accounting has typically represented an uneasy mixture of historical costs and current values, which the Accounting Standards Board (ASB) is currently attempting to regulate (Accounting Standards Board, 1993a and 1993b). However, companies are still permitted to produce full CCA information if they so wish. In practice, the only companies that have chosen to do this are regulated utility companies. These

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² These issues are discussed at greater length in Pong and Whittington (1994).

include British Gas, the regional electricity companies (RECs), the water companies and BAA. The use of CCA in the regulatory process is the subject of this paper.

II. THE CASE FOR CCA

CCA is a means of introducing current costs rather than historical costs into accounts. Thus CCA operating profit is calculated after charging the current cost of stocks consumed and of depreciation. However, it does not include appreciation of stocks and fixed assets (sometimes known as 'holding gains'). A pure CCA system ignores these because it uses an 'operating capability' concept of capital maintenance, i.e. profit is recognised only after charging for the maintenance of the real operating capability of the business.

Current cost itself is usually defined using the value to the business (VTB) method: choose replacement cost or recoverable amount, whichever is the lower. Replacement cost is defined as the cheapest possible replacement, using a modern equivalent asset, and recoverable amount is the higher of net disposal price (NRV) or present value of the additional cash flows resulting from retention of the asset (PV).

The use of a CCA method was supported by the Byatt Report (1986) in the context of regulating state-owned enterprises. It was argued that current cost represented the cost that would be faced by a hypothetical new entrant to the industry: current cost operating profit represented the surplus that such an entrant could earn from operations and current cost of the assets employed represented the costs of creating the business in a competitive market. However, a new entrant would also experience holding gains or losses due to changes in the price of the assets of the business between the time of acquisition and the time of use. These gains should be added to current cost operating profit, to produce what is sometimes called a comprehensive income measure, if we are to assess returns to the proprietors (or, in a company, the shareholders). These gains should be abated by an adjustment for the effects of general inflation, if we are concerned to measure *real* income (where 'real' is used in the economist's sense). This produces what is sometimes called a real terms (RT) accounting system. The Byatt Report proposed that state-owned enterprises be appraised using such a system: the real rate of return (the ratio of real comprehensive income to the current cost of net assets employed in the business) would be compared with an appropriate real rate of interest, in order to determine whether the enterprise's rate of return was adequate or excessive.

Edwards, Kay and Mayer (1987, hereinafter referred to as EKM) advocated an accounting rate of return derived from an RT system for appraising the performance of private sector enterprises. Their argument was based on capital budgeting theory: comparison of the accounting rate of return, measured in this way, with the cost of capital of the firm was shown, in most cases, to provide an

appropriate signal as to whether the firm's activities during the period had been profitable or not.

Building on arguments of this type, regulated utilities have since attempted to use CCA in conjunction with estimates of the cost of capital as justification for the profit elements to be built into their price-cap formulae. Such methods were, for example, used in the recent Monopolies and Mergers Commission (MMC) inquiry involving British Gas.

III. THE REGULATORY USE OF CCA

It should be remembered that the framework favoured in the UK for the regulation of utilities is price-cap regulation rather than rate-of-return regulation. A rate of return is merely one of several factors of which the regulator will take account in the judgemental process of setting the price cap. Thus the regulator really requires an information set relating to prospective cash flows rather than a single bottom-line profit number, although the dividend payments that might reasonably be expected by shareholders will be one component of the cash flows. In view of some of the difficulties in using CCA accounts, it is fortunate that everything does not depend upon a CCA rate of return. This is doubly fortunate in view of the regulatory inefficiencies which can be associated with rate-of-return regulation as practised, for example, in the US. Pure rate-of-return regulation is potentially a recipe for misdirecting management's energies towards negotiating a higher regulatory asset base or a higher permitted rate of return, rather than towards achieving a higher rate of return by greater productive efficiency or innovation in products and services to meet consumer needs. This is not to say that price-cap regulation avoids these problems entirely, but it should offer more scope for innovation and efficiency improvements.

Nevertheless, returns to shareholders must be a factor considered by the regulator, and a rate of return calculated on a CCA basis will undoubtedly play a part in the regulatory process at the time when the price cap is reviewed, as it did, for example, in the recent MMC inquiry into British Gas (Monopolies and Mergers Commission, 1993). The process that was gone through then revealed some of the obvious uncertainties in estimating relevant variables, such as the appropriate cost of capital. However, more fundamentally, it raised the question of whether VTB is the appropriate valuation basis for calculating a regulatory return in such industries and, if so, how it should be calculated.

It will be recalled that VTB is the lower of replacement cost (calculated on a modern equivalent asset basis) and recoverable amount (RA), where RA is the greater of net realisable value (i.e. selling price less selling costs) and value in use (the discounted present value of the future cash flows expected from keeping the asset in its present use). There are, of course, serious problems in estimating all these variables in an industry with highly specific assets, technical progress, and interdependence of assets in networks (raising a possible aggregation

problem). In practice, there appears to be a widespread use of replacement cost indices to estimate VTB, because estimating the modern equivalent asset is a very subjective process and market prices for highly specific assets are often absent. These difficulties alone make VTB a rather fragile basis for decisions in which large sums of money are at stake. However, there is a more fundamental difficulty in the use of VTB for regulatory purposes. This is the discount on flotation which, in MMC notation, reduces the MAR (market to asset ratio) to below unity. In the case of British Gas, the MAR was of the order of 0.4, i.e. the 'Sids'³ paid only 40p for each £1 of current cost net assets underlying their shares, a discount of 60 per cent. Thus, if they allowed a full return on the CCA value of the assets, the value of each share might be expected to rise by two-and-a-half times from flotation. In fact, by the time British Gas was referred to the MMC, the MAR had risen to approximately 0.6, and this is what, in this particular case, the MMC used as the fraction of a full CCA return on existing assets which it built into its pricing recommendations. The effect of this was to avoid reversing the gains that shareholders had made up to the time of the MMC inquiry.

We can illustrate this approach using the following hypothetical example.

Numerical Example: The Effect of the Market to Asset Ratio

Assume a privatised company is floated at $V_0 = £120$ million and has net CCA assets of £200 million.

Therefore the MAR at flotation is 0.60.

The discount on flotation, K , is therefore £80 million.

Let the rate of return, $r = 0.10$

and the depreciation rate, $d = 0.02$ (implying an average asset life of 50 years, if depreciation is straight line and scrap value zero).

Asset values are assumed to be maintained by annual reinvestment of the depreciation charge.

Year 1

Profit, $P = £200m \times 0.10 \times 0.60 = £12m$. (This is derived by assuming a full rate of return on all assets and abating it by the MAR. Alternatively, we can take flotation value, £120 million, and multiply by the full rate of return, 0.10. The principle is that shareholders should not receive a return on asset values to which they have not subscribed.)

Depreciation charge, $D = 0.02 \times £200m = £4m$.

³ The initial individual subscribers to the flotation, so named because of the advertising campaign associated with the flotation, which had the slogan 'Tell Sid ...'.

For subsequent years, allowing a full return on new investment (British Gas's proposal to the MMC)

- (1) If we assume a *stationary state*, this situation will pertain for ever, i.e. £12 million profit, representing a 6 per cent return on CCA asset values, the assets being maintained through the depreciation charge.
- (2) If we assume *growth* by retention of profits, the new investment will attract a full rate of return, and the MAR will rise: the original £80 million discount, K , will be preserved, and this will represent a steadily declining proportion of total assets.
For example, assume that the above firm retains 50 per cent of its profits at the end of year 1, i.e. £6 million.
We now have:

Year 2

CCA assets £200m + £6m = £206m.

The MAR is now $126/206 = 0.612$.

Profit is $£206m \times 0.10 \times 0.612 = £12.6m$

(or, more simply, $£126m \times 0.10$).

The CCA rate of return on all assets has risen to $12.6/206 = 0.0612$, i.e. the full rate of return (0.10) abated by the MAR.

More generally

In year t (where the first year end is $t = 0$),

$$P_t = £12m (1.05)^t$$

To be even more general, £12 million is flotation value, V_0 , multiplied by rate of return, r , and 0.05 is the rate of return, r , multiplied by the savings ratio, s .

$$\text{Thus } P_t = V_0 r (1 + r s)^t.$$

Since $P_t = V_t r$, where V_t is assets earning a full return,

$$V_t = V_0 (1 + r s)^t.$$

In other words, V grows steadily, the unrewarded element of CCA assets, K , remains constant, and the MAR rises:

$$\text{MAR}_t = \frac{V_t}{K + V_t}$$

However, this is a slow process. It can be accelerated by adopting the MMC British Gas approach (illustrated below).

This type of solution poses two potential problems for the longer term.

First, abating the rate of return in the regulated business reduces the incentive to invest, particularly in replacement investments. Although it may be argued that the shareholders did not pay for that proportion of the CCA assets represented by the discount, the company does receive a cash flow resulting from the CCA depreciation charge on all of the assets. Unless this cash flow is 'ring fenced' for replacement investment in the regulated activity, there will be an obvious incentive to invest elsewhere, e.g. in similar but unregulated activities overseas where a full return can be obtained. This could lead to under-investment in the domestic regulated industry, and this in turn may lead to undesirable pressure on the regulatory system.

Second, the MAR at flotation is likely to look increasingly anomalous as time passes, but the argument for basing the MAR on a fixed valuation of shareholders' discount, rather than a variable measure, seems to be persuasive. The MMC took a later MAR in the British Gas inquiry, thus preserving appreciation of shareholders' investment resulting from post-privatisation events and achievements, the potential for which was implicit in the prospectus and associated regulatory framework at the time of flotation. However, share prices are based on expectations, including expectations of future regulatory actions, and, if this approach of accepting the MAR as at the time an MMC inquiry started were built into the system on a regular basis, an MAR of unity (no discount) would become justified at the time of the next price-cap review, because it would be accepted by the regulators as the cost base for the future (if rate of return were the only criterion used), i.e. the share price would become a self-fulfilling prophecy. Thus, if the MMC's approach became a habit, rather than a 'one-off' pragmatic judgement, there would be a windfall to shareholders at the expense of consumers. If it does not become a habit, then future regulators will face the problem of dealing with a historically based MAR which looks increasingly anomalous.

Thus, ideally, the regulators would like the discount in the MAR to 'go away quietly', in a systematic and acceptable manner, with no windfalls to shareholders and no 'angels-on-a-pin' disputes about the nature of and justification for the discount. However, the size of the discount is such that we might parody Churchill: 'some angel, some pin'!

There are two possible means of achieving this: the MMC approach to British Gas and an alternative in which the depreciation charge allowed for regulatory purposes is abated to reflect the flotation discount, so that shareholders effectively have to pay for replacement of the discount element in assets, as it occurs. The options are described and illustrated below.

1. The MMC Approach

The MMC tried to deal with the MAR problem by saying that a full CCA return should be allowed on *all* new investment, including replacement investment.

This would mean that if the policy were pursued over a long period, the MAR would tend to approach unity (so that the discount would tend to disappear) as assets were replaced. Thus, in the short-term regulatory period which was the MMC's immediate concern, there would be no disincentive to replacement investment, and in the longer term, continuation of the policy would lead to the disappearance of the discount as the underlying assets were replaced. However, this approach benefits existing shareholders, at the expense of consumers, to the extent that it implies a higher overall rate of return to shareholders achieved by higher prices to consumers. In the gas case, a balance was struck between this and other elements in the calculation, and the effects of replacement investment on the rate of return were not great over the short regulatory horizon being considered, but it would be more difficult to strike such a balance in more extreme cases and for longer time horizons. For example, the water companies had MARs on flotation of the order of 0.1. In such a case, pursuing this approach over the long term, leading to an eventual MAR of unity, would imply a tenfold increase in the share price over flotation price.

Using our earlier numerical example, we may illustrate this as follows.

Numerical Example, Allowing a Full Return on All Investment, Including Replacement (MMC Approach to British Gas)

- (1) If we assume a stationary state, as in the earlier example (1), there will be replacement investment to maintain the assets, and this will raise the future levels of profit, to the extent that replacement of the K element will now receive a rate of return. The V element and its replacement earn a rate of return in every case considered in this paper.

Year 2

CCA assets £200 million, of which £120 million + £1.6 million is available for full returns (£1.6 million being the replacement expenditure attributable to the discount, K , i.e. $£4m \times 80/200$).

The MAR is now $121.6/200 = 0.608$.

Profit = $£200m \times 0.10 \times 0.608 = £12.16m$

(or, more simply, $£121.6m \times 0.10$).

The CCA rate of return has risen to $12.16/200 = 0.0608$.

If depreciation continues on a straight-line basis, the same increment will occur in all variables for each of the next 50 years, i.e. until the assets are all replaced, when the MAR will be equal to unity and a full rate of return allowed on all assets.

In general,
$$\text{MAR}_t = \frac{V_0 + tKd}{V_0 + K}$$

The denominator remains constant (at total CCA asset value) because of the stationarity assumption. V_0 is also constant, and the other element in the numerator increases with time. Since $d = 0.02$, when $t = 50$, $tKd = K$ and the MAR is unity. At this point, all the originally acquired assets are written off, and the MAR ceases to be relevant. Shareholders receive a full return (0.10) on all assets.

- (2) If we assume growth by retention, as in the earlier example (2), the MAR again reaches unity after 50 years, but the initial proportionate decline is more rapid, due to the twin effects of replacement investment and new investment.

Year 2

CCA assets £206 million (as in the previous illustration (2) above) of which £126 million (original investment, with replacement, plus new investment) + £1.6 million (replacement investment on K) is available for full return.

The MAR is now $127.6/206 = 0.619$.

Profit = $£206m \times 0.10 \times 0.619 = £12.76m$

(or, more simply, $£127.6m \times 0.10$).

The CCA rate of return has risen to $12.76/206 = 0.0619$.

The element of assets that does not earn a rate of return, K , will decay by depreciation, tKd , up to year 50, as in (1) above. In addition, there will be new investment which will attract a full return, causing the MAR to rise, as in (2) of the previous numerical example, but at a higher initial rate, if we assume a constant retention ratio, because profits will be higher in the present case due to the returns on replacement investment.

2. The Alternative Approach

The alternative approach avoids the problem of the MMC approach, but would inevitably be less popular with shareholders as a long-term policy: there are no 'free lunches' in determining distribution between shareholders and consumers. This approach would be to abate the rate of return *and the CCA depreciation charge* on existing assets by the MAR, but to allow a full CCA return on all new investment, including replacement (as in the MMC approach). This would imply that the privatised companies would have to raise additional finance for much of their replacement investment, rather than relying on cash flow from depreciation charges. In the long run, when existing assets were replaced, it would imply a similar result to the MMC's British Gas proposal, a full CCA return being allowed on all assets. However, in the shorter term it would imply lower profits

for existing shareholders and lower prices for consumers. The higher returns to shareholders in the longer term (as the MAR approached unity) would be justified by the additional capital raised, so that the gains from the disappearance of the discount would not accrue to existing shareholders, unless they raised the additional finance by retaining profits in the business rather than taking them out as dividends.

The numerical example can be extended to cover this method, as follows.

Numerical Example, Allowing a Full Return on All Investment, but Disallowing Depreciation on the K Element (the 'Alternative' Approach)

- (1) In the stationary state, the effect of this will be to require shareholders to contribute more capital. This would be done by reducing distributable profits. In our example, distributed profits would have to be reduced by £1.6 million to fund the necessary replacement. Thus we have:

Year 1

Company's profit, $P = £12\text{m}$ (as before) – £1.6m (replacement depreciation on K element, disallowed in the price formula) = £10.4m.
Regulator's depreciation charge, $D = £4\text{m}$ (as before) – £1.6m (disallowed element) = £2.4m.

The CCA rate of return is $10.4/200 = 0.052$.

The accounts will report the full depreciation charge (£4 million), but the regulator will allow only £2.4 million for price-setting. Hence the lower profit. There will be correspondingly lower charges (lower by £1.6 million) to consumers.

Year 2

The £1.6 million replacement investment is added to the shareholders' share of the assets and deducted from K , so that

$$\text{the MAR is now } \frac{120 + 1.6}{200} = 0.608$$

Profit, $P = (£200\text{m} \times 0.10 \times 0.608) - £1.6\text{m} = £12.16\text{m} - £1.6\text{m} = £10.56\text{m}$,

i.e. the £1.6 million replacement depreciation of K is still withheld, but there is a full 10 per cent return on the previous year's replacement of K .

The CCA rate of return is $10.56/200 = 0.0528$.

In general

If we maintain the steady-state assumption (no new investment), the MAR will increase annually as a result of the £1.6 million replacement investment on the K element:

$$\text{MAR} = \frac{120 + 1.6t}{200}$$

Profit will rise correspondingly:

$$P = (\text{£}200\text{m} \times 0.10 \times \frac{120 + 1.6t}{200}) - \text{£}1.6\text{m}$$

When $t = 50$, the MAR will equal unity and a full rate of return will be earned on all assets.

At this stage, both the MAR adjustment and the replacement depreciation adjustment will become irrelevant (all of the initial K assets have been written off), so that

$$P = \text{£}200\text{m} \times 0.10 = \text{£}20\text{m},$$

i.e. the regulator cancels the replacement depreciation adjustment on K by offsetting it against the return on replacement investment, which, along with the replacement depreciation adjustment, was relevant only while the K assets were being depreciated. This leads to a full return on all assets:

the CCA rate of return is $20/200 = 0.10$.

This full return is justified by the shareholders' contribution of £1.6 million p.a. to replace the K assets, i.e. $50 \times \text{£}1.6\text{m} = \text{£}80\text{m}$. This led initially to a rate of return of only 5.2 per cent p.a., which rose gradually to 10 per cent as the replacement investment accumulated.

- (2) If we assume growth by retention, as in the earlier cases, both the numerator and the denominator of the MAR will be increased by equal rises in V , thus increasing the MAR, but MAR will not reach unity until the K assets are entirely written off, i.e. year 50.

IV. THE RECOVERABLE AMOUNT PROBLEM

A recent study by Carey et al. (1993) has formalised the MAR problem in terms of VTB. They point out that the market value at the time of flotation can be regarded as an estimate of the value in present use of the industry's assets, having regard to the regulatory framework and the limits which this imposes.

Since the assets of utilities are highly specific, NRV can be safely ignored, and we can therefore regard value at or immediately after flotation as the stock market's estimate of recoverable amount. Since this is less than recorded CCA value at the time of flotation, we can argue that, under the VTB convention, flotation value should set the recoverable amount cap, leading to a write-down of CCA values. The fact that this was not done in the case of the privatised utilities suggests that the utilities were not really concerned with CCA values and were really reporting replacement cost (RC) which is only one component of the VTB calculation, and, in this instance, is not the component that should be reported. The privatised utilities are, in effect, what the Byatt Report would have described as 'price takers', although the reason for this owes at least as much to the efforts of regulators (through the price cap) as to the threat of competition which Byatt had in mind. However, if we accept that the VTB, which underlies the CCA system, depends on the regulator's policy, it can hardly provide independent evidence on which that policy is based. Thus CCA done properly (i.e. incorporating the present value of expected future cash flows) cannot provide an appropriate base for regulation.

This approach to VTB effectively impounds negative goodwill, due to regulatory restriction, in the aggregate asset values. It should also be remembered, however, that the regulator might also wish to take account of positive factors, such as abnormal efficiency gains and service or product innovations, in setting the price cap. If we wish to persist in interpreting the setting of the price cap as an application of rate-of-return regulation, we can formalise these positive factors as positive goodwill, on which a future rate of return will be allowed. However, the difficulties which the Accounting Standards Board is currently facing with respect to accounting for intangible assets and goodwill suggest that such an approach may not yet be ready for practical application, especially if (as in the case of regulated utilities) enormous sums of real money may depend upon the precise results of the calculation.

In practice, it seems that the regulated utilities are more concerned to produce replacement cost accounts rather than CCA accounts based on VTB. These accounts would be useful for regulatory purposes if the MAR problem did not exist (i.e. the MAR were greater than or equal to unity) and the companies were what Byatt characterised as 'price makers', i.e. monopolists with wide discretion to set their own prices. It may be that, to capture the full spirit of the Byatt framework, even in this situation the companies would have to pay more attention to the idea of the modern equivalent asset, although this can be difficult in practice and Byatt himself has condoned the use of price indices as a practical approximation, in his subsequent role as Director General of OFWAT. The danger of using price indices is that they may fail to capture the potential cost reductions arising from technical improvements (as in the modern equivalent asset) and may therefore lead to an inflated cost base for regulatory purposes.

V. CAPITAL MAINTENANCE

One other feature of the Byatt (and EKM) framework which is distinct from CCA as practised (under the influence of SSAP 16) in the UK is the use of a financial (money) capital maintenance concept to measure total gains (or 'comprehensive income') rather than the specific index concept ('operating capability') used in CCA operating profit as implemented in SSAP 16. If a further adjustment for inflation were needed, in order to arrive at a real profit measure (RT), the gearing and monetary working capital (MWC) adjustments of CCA (of SSAP 16) would be replaced by the gain on borrowing and loss on holding money, calculated with respect to the rise in the general price index, and the holding gains or losses for the year on the physical operating assets of the business (fixed assets and stocks) would be converted into real terms by the application of a general price index before calculating the total return to shareholders. Thus, if an index of the industry's assets increased faster than the rate of inflation during the year, there would be a real gain, and conversely, if the industry-specific assets index rose by less than the rate of inflation, there would be a real loss.

The reason for this financial approach to capital maintenance, rather than the physical operating capability concept used in pure CCA, is that the EKM and Byatt approaches are based upon articulation of the accounts, gains in value recorded in the balance sheet being included in the measure of returns to shareholders. The intuition behind this is that the value of assets will later be charged to customers through depreciation or cost of sales charges, as the assets are used to provide goods or services. Thus, if that value is achieved partly by appreciation after purchase, the appreciation is a gain to shareholders, representing a saving achieved by buying early (before the price rise) rather than later. The abatement of holding gains by a general price level index is justified by the need to calculate a *real* rate of return to compare with a real cost of capital. If, however, the yardstick is nominal (money) cost of capital, there is no need for inflation adjustment: the profit measure will be profit plus total gains, the latter being measured in money terms, with no index adjustment of the opening value, but holding gains and losses will still be included in the total profit measure.

VI. CONCLUSION

Current cost accounting has been examined from three different perspectives.

The accounting standard-setting perspective suggests that CCA is, at best, a remote prospect as standard accounting practice in the UK. Systematisation of the valuation base, to include more current values, possibly on a VTB basis, has been proposed, rather tentatively. However, the subjectivity of such valuations, especially for specific operating assets, such as plant and machinery, is likely to

rule them out as standard practice for some time. With regard to capital maintenance, the form of CCA used in SSAP 16, with gearing and monetary working capital adjustments, is unlikely to re-emerge, but the ASB seems inclined to favour a 'layered' approach like that of the Byatt Report, with a 'real terms' bottom-line profit figure.

The theoretical perspectives both of the Byatt Report and of Edwards, Kay and Mayer (1987) suggested that a rate of return based on real terms accounting (VTB asset values with general indexation of capital when measuring income) was a useful measure of economic returns, for comparison with the real cost of capital.

Finally, the regulatory perspective suggests that there are particular problems in applying such a system to the privatised utilities. Apart from the practical problems of assessing the cost of the modern equivalent asset, there is the much more difficult problem that stock market values have typically been below the replacement cost value of assets per share, and were so at the time of flotation. This means that the effective VTB can be regarded as being determined by the share price, rather than the cost of replacing assets. Options for dealing with this problem were discussed: each is likely to be unpopular with either the shareholder or the customer, depending upon who is favoured by it. Even if this problem were solved, there would be an endemic problem of measuring the 'goodwill' that the company has created by efficiency improvements and innovation, and that should be awarded a return by the regulator.

In view of these difficulties, it is fortunate that the regulatory regime is a price-cap system rather than rate-of-return regulation. Rate of return does have a part to play in the dialogue about the price cap and, in particular, the returns to investors that are allowed, but it should not be required to take more weight than it can bear.

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