

THE CASE FOR DEPRIVAL VALUE

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THE CASE FOR DEPRIVAL VALUE

Introduction

Deprival value (often as ‘value to the owner’ or ‘value to the business’) has become not unfamiliar in Britain and Australia. However, it is little known elsewhere, and is not always understood. This is a pity. It provides a coherent principle for selecting the most defensible type of current value for each kind of asset and liability, and for finding the value’s size. Its general use would make accounts more consistent and comprehensible.

Moreover valuation theory may soon be a matter of increased concern to accountants, as the IASB and ASB are now likely to issue *ex cathedra* pronouncements on the topic. The Boards seem to be leaning to ‘fair value’, variously defined (A Lennard, 2002)

So a simple re-statement of Deprival Value rules and uses may perhaps not come amiss.

Valuation is an area where traditional accounting textbooks were weak. They might give little or no space to a general treatment. The sections on a class of assets might include a statement that such-and-such a value is here to be preferred – perhaps for little reason save that it is favoured by some prestigious body. Occasionally a brave author did venture a thoughtful chapter on value; but its findings tended to recommend what is practical and familiar, and hardly amounted to a general theory.

Adam Smith's 'Values'

Articles on these matters would be vastly improved if they started with Adam Smith's words:

“value” has two different meanings The one may be called “value in use”, the other “value in exchange”.

Fuller employment of these phrases - not least in official Standards - would do much to aid our thought and remove ambiguity. They will here be used liberally.

Accounting has found great advantages in backing value-in-exchange (historical or current) rather than value-in-use. The latter relies on forecasts, sometimes vague and uncertain; its main role is in budgets to aid decision making, not in book-keeping. The accountant prefers the more sober figures of value-in-exchange; and, as routine book-keeping gives him many of these with no trouble, he lets them dominate his balance sheets.

Comparators

Frank Knight of Chicago told us 'Every valuation is a comparison'. I think my house has a value of x (that is, I guess it would fetch x as value-in-exchange) because the house next door sold for x . I think £1,000 due to me a year hence is worth only £950 now - because my deposits of like risk grow at about 5% per year.

In our search for value figures, we should be lost without 'comparators'.

Bonbright

The deprivation doctrine is the child of James C Bonbright, a charming and scholarly man who taught finance at Columbia 1920-60 and was

chairman of the New York State Power Authority 1937–46; he died in 1985. He set out his views on value in his *Valuation of Property* and (as co-author) in *Principles of Public Utility Rates*.

He wrote the formidable *Valuation* (1,271 pages) with a light touch and flashes of wit. Deprival value is introduced on page 72:

When I say “My house is worth \$10,000 to me”, I mean (if I am precise in my use of language) that the retention of the house is worth to me as much as the acquisition of \$10,000 in cash would be worth to me. However, this is the same thing as saying that the anticipated loss of my ownership interest in the house has an adverse value to me of \$10,000. Such negative terms as “anticipated loss”, “damage”, and “injury” ... are simply the converse of such positive words as “value”, “worth”, and “importance”.

Thus an asset’s ‘value to the owner’ is identical with the loss he would suffer if deprived of the asset. It is the amount of money that then would just ‘make him whole’.

Our more familiar approach to value conjures up visions of benefits that would follow acquisition of an extra asset. The deprival principle tells us to look instead at the disbenefits following the loss of an existing asset.

Deprival reasoning can be regarded as an example of the marginal approach, and should therefore commend itself to persons trained in economics. It attempts to answer the all-important question ‘what difference does it make?’ – in valuation, by how much would an owner be worse off with only $(x - 1)$ asset units instead of (x) units.

Value budgets

We make countless decisions by comparing the results of various possible courses. The deprival principle extends the familiar mental process to valuation.

In effect, it tells us to measure value by comparing two budgets:

- (1) showing the relevant cash flows if the owner retains possession of the asset (the 'Have' budget); and
- (2) showing the flows if he is deprived (the 'Have Not' budget).

The contrast between (1) and (2) is the asset's value.

The budgets' layout is the same whether the aim is to find value-in-exchange or value-in-use. Suppose the asset is an investment yielding yearly payments. Its value-in-exchange would be the estimate of a (hypothetical) fully-informed buyer whose budgets would show his expectation of the payments' amounts, discounted at the market's rate for equally risky investments. Where instead an owner wants to guess value-in-use (say, as the minimum price he would accept from a would-be buyer), the budgets will show his own estimate of the payments, discounted at the rate that he expects to earn on similar assets.

Deprivation value (like 'fair value') is of course a current figure; its reasoning must reject by-gones.

'Satisfactory' assets

Deprivation value depends on the circumstances of the particular asset. The valuer must in each case choose between three figures:

- (i) value-in-exchange for buyers;
- (ii) value-in-exchange for sellers; and
- (iii) value-in-use.

Let us first consider the normal 'satisfactory' asset, *ie* one that a deprived owner would want to replace.

We must assume that he would obtain the replacement in the most economical way possible; and further that he could replace smoothly,

so that his trade, *etc*, would not be interrupted and he would suffer no loss of revenue or use.

In simple cases, his 'Have' budget can be left blank. His 'Have Not' budget will show the outlay that deprival would force him to make - the cost of buying a similar asset. The difference between the budgets is deprival value, here replacement cost. The asset's revenues and running costs, being undisturbed, are irrelevant.

This disregard of revenue is perhaps the biggest obstacle to acceptance of the deprival approach. Such disregard may seem perversely at odds with important notions derived, in particular, from study of value-in-use. However, if the revenues and running costs remain undisturbed by replacement, they do not affect the budget contrast and value.

Thus suppose a grocer deprives his shop of some eggs by taking them home for supper. He need not thereby lose sale receipts; by replacing his stocks in good time, he will still be able to sell an undiminished number of eggs and get an undiminished flow of trade profit. He loses only replacement cost. (Of course the budgeter could, with sad indifference to marginal thinking, put net revenue into the 'Have' budget and again into the 'Have Not' budget - but the contrast between the two budgets would still be replacement cost.)

'Replacement cost' is not always the cost of an asset like the one owned. It is the cost of replacing that asset's services, in whatever is the cheapest and most efficient way.

An economist can doubtless suggest various refinements to the simple argument. Thus he can point out that there may be advantages in delaying replacement (*eg* because of uncertainty about future demand for the firm's product); replacement should take place only if its benefits exceed cost and the value of keeping the investment option alive (A W Stark 1997).

The use of deprival values has the incidental benefit of freeing the accountant from problems of mere physical flow (FIFO *versus* LIFO,

etc.). Conventional practice forces him into the absurdity of valuing identical assets at different prices because of different acquisition dates. But ‘we cannot define wealth in physical terms ... it is wealth because it is scarce’ (Robbins 1949).

Unlike replacements

Sometimes, however, replacement would not leave revenues and running costs undisturbed. Then indeed the budgets must allow for the changes. For instance, a replacement asset would not always be exactly the same as the lost asset. The firm’s methods may be changing, so that a modified asset is now desirable; and the makers of assets may be improving them, so that a modern replacement would cut costs or raise revenue.

Thus suppose the price of the replacement is 1,000 and installation costs are 200, but the benefits of asset improvement are 500. The ‘Have Not’ budget now shows $1,000 + 200 - 500 = 700$. A payment of 700 would make the owner whole, and is deprival value.

‘Unsatisfactory’ assets

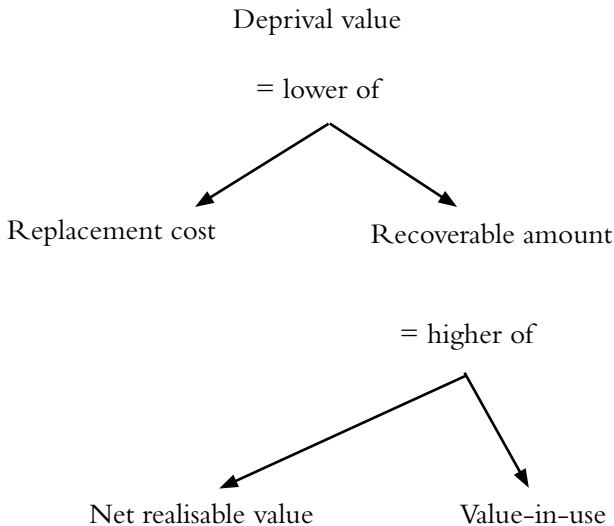
So far, we have been measuring a ‘satisfactory’ asset, *ie*, one that an owner, if deprived, would want to replace. However, sometimes he will deem an asset not worth replacing. Its price now outweighs benefits; the price may have gone up, or benefits may have sunk (*eg* where a machine’s product has become unfashionable).

The owner of an ‘unsatisfactory’ asset will decide whether to sell it or keep it. If he decides to sell, deprival would rob him of market proceeds, which thus are deprival value. But the future benefits from continued ownership (*eg* of a machine) may seem likely to exceed this ‘net realisable value’; the asset (though something of a lame duck) is

still worth keeping. Here deprival would cause loss of the benefits, and so that loss is deprival value.

However, in time the benefits may dwindle away; a machine may become unreliable and lose vitality (the word of early railway accounting), and the owner will in the end have to get rid of it. Final benefit will be net realisable value. Deprival value of an unsatisfactory asset (often called ‘the recoverable amount’), therefore, is the higher of net realisable value or value-in-use.

The reasoning of the above pages has been boiled down to a familiar diagram:



The diagram’s reasoning should be familiar, as it is used for many of our decisions. Suppose a manager is calculating whether a proposed job would be worthwhile. If it will use up satisfactory stores, he will argue that its sale revenue less other costs must at least cover the stores’ replacement cost. If the stores are unsatisfactory, the net sale revenue

must at least cover the higher of their net realisable value or their use-value (perhaps as substitute for cheaper stores needed for other jobs).

With some assets (*eg* shares), replacement cost and net realisable value may be close to one another (perhaps being separated only by transaction costs). However, consider an old machine that now has only two years of life left. The gap between replacement cost of a brand-new machine and net realisable value will be big. In the market's eyes, however, old and new have become different kinds of asset; replacement cost is now the purchase price of a worn machine with two years of life. (If the deprived owner replaces with a new machine, he is making extra investment.) Net realisable value may be low because of costs of repair, marketing, *etc*; and we may assume, realistically, that the markets are imperfect in various degrees (see M Bromwich, 1975).

Benefits of use

The benefits of ownership (*ie* use-value) may be earnings from sale of the asset's products or from renting it; or they may be cost savings (such as wage reduction thanks to the asset).

To find use-value, the valuer must estimate the benefits, and then discount them (the earnings rate of his general assets presumably providing the discount comparator).

It follows that use-value must normally be highly subjective; in companies, it will probably be a guess by managers. Its full analysis may demand mathematical refinements, *eg* a probability range. These considerations have led some thoughtful critics (Whittington, 1983) to say that use-value can form no part in practical valuation; and we must recognise that it is a weak link in deprivation reasoning. Still, owners rely on some dim figure of use-value when deciding whether to sell an asset or whole business. Perhaps managers find an adequate approximation, when valuing obsolete assets, in fractions of replacement cost.

Jointness

'Jointness' may defeat any rational attempt to ascribe use-value to particular assets. Where assets form a close-knit team, figures for each asset's share of the team's benefits would be somewhat meaningless.

Professor Edey's bridge on a main railway line is an apt example. Its loss would stop the whole line from earning, so use-value would be immensely high. And the same would be true of each of the other bridges; aggregation would be absurd.

Irreplaceable assets

Our reasoning has so far assumed that a deprived owner can get a replacement.

If replacements are not to be had, deprival value must be the recoverable amount, probably earnings lost because of deprival. The amount may be high - scarcity enhances value.

Brands are by definition irreplaceable. Their recoverable amount must be shadowy, depending on the valuer's estimate of the extra earnings to be had thanks to the brand.

Firms making their own stocks

A factory deprived of a single unit of product may well be able to replace it. Value is marginal cost, *ie* prime cost plus any increase in overhead caused by the extra work of replacement. Deprival reasoning, therefore, supports the manufacturing firms that value stock at marginal cost.

It is noteworthy that routine balance sheets value a firm's whole stock as the sum of the individual parts. This is sensible; valuation of the whole would otherwise involve impossible difficulties. Insurance

claims for the whole stock may use an arbitrary amount such as the sum of the parts' standard costs, and perhaps loss of profits.

Where a firm makes its own equipment, replacement loss would again be prime cost plus overhead increase caused by the extra work; and any increase in borrowing costs would also be relevant ('interest is a cost of production', economists tell us).

The costs of a long-term contract can usually be hived off more clearly than those of factory products. Deprival value is probably the replacement cost (at today's prices and wage rates) of the work done so far - but with an eye to any savings that hindsight can now see to have been possible. While construction is under way, the firm will have funds tied up that could be earning; so interest is also a deprival loss. And (it might be argued) a further loss will follow because the replacement delay will prevent the asset from starting to earn as soon as was originally expected; but this idea clashes with our page four assumption that deprival would not interrupt trade.

The parts and the whole

It will sometimes happen that the sum of the deprival values of all the assets adds up to more than the firm's value. Here accountants are inclined to argue that the sum of the parts cannot exceed the whole, and so the parts' values must be written down.

This seems wrong. There is no logical basis for allocating the write-down between assets; reduced values would be seen to be absurd where the assets consisted of cash and rights firmly fixed to cash (see K F Gee and KV Peasnell, 1976). Moreover the written-down figures would distort the rate of return on capital. If the accountant wants to show the firm's value (in breach of accepted practice), he could do so by making a deduction from the asset total.

Financial instruments

Because firms now deal increasingly in dynamic international markets, financial instruments have grown in prominence, and both the ASB and the IASB are paying much attention to them. A financial instrument may be primary (eg a straightforward holding of dollars) or a derivative (eg options and futures). It is an asset to firm A and a liability to firm B.

The Standards Boards here seem to be groping with notions of fair value (defined as the amount at which an asset could be exchanged between willing parties acting at arm's length) and market value. The distinction is not the clearest.

Deprival reasoning suggests again that the three-pronged formula of page seven should be applied. But perhaps there may be cases where no exact replacement of a peculiar asset exists. Here it would seem right to value at use-value (often the discounted present worth of the asset's maturity proceeds).

Depreciating assets

Deprival reasoning can greatly clarify depreciation problems.

The accountant's tacit assumption is that a depreciating asset's 'using up' per year is constant, and so its yearly cost is constant. The familiar straight-line method writes down cost on this reasonable assumption.

Therefore if a satisfactory asset with a six year life costs 1200, we accept that its value pattern is likely to be 1200, 1000, 800 ... *ie* yearly loss will be constant at 200.

Comparative budgets show these figures to be also deprival values (where the facts are simple).

The proof can take several forms. One helpful form argues that the owner has paid 1200 for six yearly doses of equally valued services,

ie 200 per dose. Thanks to this prepayment, his asset's 'Have' budget at the end of year one shows that he faces no further outflows till after year six. His 'Have Not' budget shows that deprival would make him at once pay the replacement cost of 1200, but would at the end of year six leave him benefitting from 200 of remaining 'overlap' services for year seven; $1200 - 200 = 1000$, and so on in later years.

The deprival value, therefore, of a depreciating asset is linked to its replacement cost less its overlap benefits.

The budgets must rely in part on speculative forecasts; depreciation is not a matter of slicing up past or current cost, but depends on the asset's future flows.

Two flows as well as replacement cost are relevant:

Repairs

Repair outlays are exactly the same in principle as the price paid for the asset; both are costs of ownership. The full cost per year must cover repairs plus depreciation.

If the asset's 'using up' per year is constant, full cost per year must also be constant, *ie* yearly depreciation charges must be varied so as to complement repairs.

Interest

It is fundamental that where a set of flows stretches over a time period, their precise measurement must pay heed to the time-value of money. The flows of a depreciating asset are such a set, and so discounting of future flows would improve valuations.

To finance the asset's purchase, the owner must either borrow or give up other assets. Then he must either pay loan interest or forgo those assets' potential earnings. Such disbenefits are the 'interest'; and they point to the rate for value calculations. (And, *pace* some distinguished

theorists, this cannot be the 'internal' rate that the asset earns on its own narrow activities.)

Like price and repairs, interest should (for accurate figures) be treated as a cost of ownership; the constant annual charge against revenue should cover both depreciation and interest. The proportions will change over the asset's life; as loan is repaid, *etc.*, interest falls, and depreciation rises; the value pattern curves. (The curves can be reflected in ingenious bookkeeping.)

Depreciation is explored more fully in the appendix.

Liabilities

A theorist may well grow diffident when he moves from assets to liabilities. He must now struggle with unfamiliar ways of thought; and, if he seeks aid from writers, he will find many of them remarkably reticent.

Deprival reasoning suggests that the valuer must again compare 'Have' and 'Have Not', and so find 'relief value'. How much would net assets grow if a liability were removed from the balance sheet? How much richer would a debtor become if (say) third parties, as the consideration for some deal, relieved him of a liability?

In relief budgets, 'Have' shows the amounts (principle and sometimes interest) that the debtor would pay the lender to discharge the debt. 'Have Not' is blank. Relief value is the difference - the improvement in the debtor's flows thanks to relief.

A borrower is in a sense like the buyer of an asset, since he too gets benefits (loan money) in return for a price (repayment cost). A valuer is concerned with this delayed price.

A liability's 'value in use'

A person borrows in the belief that he will make the loan earn more (when invested in extra assets) than his payments to the lender. In his eyes, the liability burden is his own estimate of these payments – discounted with his own estimate of his assets' earnings rate or the interest rate on another loan; the rate therefore indicates the sum that would, invested to best advantage, grow to the amount of the payments.

This subjective value clearly is the counterpart of an asset's use-value. It too is a guide to decisions rather than a figure for accounts. It may be volatile. Thus it may change if the debtor (perhaps unlike the market) foresees revision of the payment charges, or inflation and a consequent reduction of payments in real terms.

Sometimes a debt can be repaid at once; or repayment may be postponed and interest paid; or there may be some compromise, such as repayment by instalments. The debtor will compare the prompt repayment amount with his estimates of the present values of later payments, and opt for the smallest repayment method. This cost is what relief would spare him, and is relief value.

Because of the link with asset earnings, *etc.*, a clear-cut valuation of a liability may be elusive.

Where a firm makes provision for some future outlay, the provision's relief value must use an estimate of that outlay. If the balance sheet includes deferred revenue (as where a magazine publisher gets subscriptions in advance), measurement must probably be a crude compromise as the issues are complex (R Macve, 2002a).

A liability's 'value in exchange'

A liability may be traded in the market, *ie* has a value-in-exchange.

When an investor buys a financial asset, he may pay a full market price; the seller then bears transaction costs, *etc*, and so gets only a net market price. Similarly a liability's price may be gross or net: if a debtor is to discharge a liability, he may well have to bear the transaction costs, and then relief value (for a balance sheet based on market rates) is a gross amount.

If the debtor's balance sheet shows fall in the exchange-value of his liabilities, it will portray him as getting richer. This is reasonable if the change is due to increase in market interest rates; but it is somewhat absurd where it is caused by growing doubts about the debtor's credit worthiness.

'Unsatisfactory liabilities'

The normal liability is 'satisfactory' - *ie* the debtor deems subjective value less than the assets that he would have to give up in order to finance repayment. The story gets interesting where the liability is 'unsatisfactory', so that the debtor wants to repay quickly.

Here relief would spare the debtor the need to repay. Relief value is again the repayment amount (as defined above).

A liability's exchange-value, therefore, is almost always the repayment amount.

False trails

If a writer stops after penning the last sentence, he has reached a satisfactory conclusion; he has provided an adequate definition, and need go no further. But unfortunately he is apt not to leave well alone.

It is immensely tempting to suppose that as a liability can be looked on as the mirror image of an asset, its values must form a pattern that is the mirror image of the asset's three-pronged deprival pattern on

page seven. Many theorists (see *eg* the weighty Australian Accounting Research Foundation's *Measurement*) have exerted themselves in efforts to find such a pattern.

Unfortunately the idea of a mirror image is treacherous. The asset's value pattern starts with replacement cost, then can have a tail of falling use-values, and ends with net realisable value. Thus it duly includes the three values of the page seven diagram.

But the pattern of a satisfactory liability stays at repayment cost throughout life. If the liability becomes 'unsatisfactory', the debtor will plan to repay it as soon as possible, repayment cost stays dominant. The relief pattern has no tail of different values.

If the debtor is unable to pay in full, relief value will be whatever sum the creditor seems likely to extract, *eg* at bankruptcy. Value is still a repayment amount; again there is no extended tail of different kinds of value.

Only if quick repayment is not feasible (*eg* if there is a penalty for early redemption) will a liability pattern for some time have a tail. But this will stay bound to eventual repayment.

Thus a liability's relief pattern can hardly ever contain figures comparable to an asset's three possible values. A liability does not grow obsolete. Its value remains firmly at repayment cost, and is not the mirror image of an asset's value.

Replacement loan

A relieved firm might decide to borrow afresh. This possibility has led some writers (including me, alas) to try to insert 'replacement loan' into a liability's value pattern. Replacement is important for asset valuation; so why not for liability valuation?

The argument for replacement loan assumes that the debtor, when relieved, would want to borrow the same amount again in order to extend his assets – but he might very well have no such intention. If

he would benefit from extension, why has he not extended already? Extension plans depend on the marginal productivity of an expanded asset set.

Replacement loan would be offset in the balance sheet by the extra cash received. So it can hardly be looked on as a relief benefit.

And replacement cost is important for assets because the deprived owner of a satisfactory asset gains by replacing, and thus probably will replace; whereas if a debtor has already borrowed his optimum amount, further borrowing would decrease his income and be unwise.

So replacement loan cannot fit comfortably into the liability pattern, and attempts to squeeze it in must muddle our reasoning.

The asset's three-pronged diagram cannot be transposed to liabilities.

Conclusion

Deprival value gives a consistent way of choosing between methods of valuing. It yields figures that probably match general ideas of 'the size of the tools'. It accords with our well-proven reasoning for tackling a wide range of problem. It seems at least sufficiently logical and useful to merit trial.

APPENDIX

DEPRECIATING ASSETS

Repairs

Ideally repairs should in the ledger be capitalised. The augmented asset figures should then be written down with constant charges, covering capital maintenance and average repairs. If repairs vary from year to year (eg when there is a costly overhaul), the asset's value will move erratically, correctly reflecting the state of repair.

The accountant seldom capitalises repairs, and he makes little effort to find depreciation charges that complement repairs and so produce the constant costs. He may, however, improve his figures somewhat, where repairs rise over the asset's life, by using the 'fixed percentage of the declining balance' method. Because its charges are high in early years and low later, it produces annual totals of depreciation plus repairs that may be fairly constant. Its 'high-low' depreciation charges make the asset's value fall steeply at first, and then slowly.

Deprival budgets confirm that this 'sagging' value pattern is correct. 'Have Not' budgets show total cost for a life, less - for each 'overlap' year - the annual average of that cost; it is unaffected by the repairs' timing. 'Have' shows repairs for the remaining life. In early years, it is swollen by the high costs of old age; the owner's loss on deprival ('Have Not' minus 'Have') is thus markedly reduced; value falls steeply. Later, when 'Have' includes only the lower repairs of early life, the value curve's decline becomes less steep.

Interest

Depreciation charges cut profit and dividends, and so help the firm each year to repay initial loan or rebuild the assets sacrificed for the purchase. These improvements lead to a yearly drop in ‘interest’ cost, at a compound rate. To keep full cost charges constant, depreciation charges must each year be increased correspondingly. With equal yearly services, the asset’s value acquires a ‘humped’ pattern.

In a simple scenario, as we have seen, the owner of our six-year asset can calculate values on the assumption that yearly cost (excluding repairs) is 200. But if he allows for interest, this raises yearly cost: 1200 is the equivalent of a six-year annuity of 276 if the interest rate is 10%, and 276 is the asset’s full yearly cost (like a leased asset’s rent covering both depreciation and interest). If the asset does not earn as much as 276, it is a poor investment.

At the end of year one, a deprived owner would have to pay 1200 at once, but would gain the replacement’s overlapping benefits of 276 at the end of year six. When discounted at 10%, this remote 276 is reduced to 155; so value is no longer $1200 - 200 = 1000$, but goes up to $1200 - 155 = 1045$. Values of later years can be found with the same reasoning.

Depreciation values that allow for interest can be explained in a table of ‘Have’ and ‘Have Not’ budgets. Let us again use the six-year asset’s figures. One possible layout keeps the ‘Have’ line blank; the ‘Have Not’ line shows the 1200 replacement outlay reduced by the present values of the 276 benefit overlaps for years after six:

Year	1	2	3	4	5	6
'Have' future costs	-	-	-	-	-	-
'Have not': future net costs	1045	874	685	478	250	-
Value (cost obviated)	1045	874	685	478	250	-
Depreciation charges	155	171	189	207	228	250

Sophisticated charges thus start in year one at less than the 200 straight-line figure; but they must in later years go up to complement the 'interest' decline (passing 200 near mid-life).

An alternative calculation uses the present values of flows for long successions of future overlapping 'Have' and 'Have Not' lives stretching to the remote time horizon. Readers with a taste for annuity calculation may explore this approach, which can allow for expected future price changes.

An accountant may perhaps reflect that, as repairs make for a sagging value pattern and interest for a humping one, the two conflicting forces may just about cancel one another, and so he can be pardoned if he sticks to his favourite straight-line method.

We may be tempted to wonder how the sophisticated deprival value of a depreciating asset compares with the price of a second-hand asset with the same remaining life. This price too must surely reflect interest and state of repair.

If a person decides that it is advantageous to replace with a new (long-life) asset, rather than with a series of old (short-life) assets, he must believe that the new asset works out cheaper than the old – probably because of his having a lower cost-of-capital than less affluent buyers. So, if his sums and predictions are correct, his value pattern would seem to be below the pattern of second-hand prices.

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