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## Special Applications of Discounting\*

BY WILLIAM A. PATON

Discounting, the measurement of the future in terms of the present, is a process which permeates the entire fabric of economic life. Indeed, some economists have urged that this is the basic valuation process and that all prices express literally prospects or expectations reduced to current values. The influence of this view upon economic reasoning is further seen in the familiar conception of the building or machine as a bundle of uses or services, and in the theory of interest expounded by Böhm-Bawerk, banker and famous economist of the Austrian school.

From the viewpoint of business and accounting, discounting may be defined explicitly, yet broadly, as the process of reducing one or more future considerations, certain in amount and in money or its equivalent, to effective present market value, a value which may appropriately be recognized in the statement of financial condition. This process is undoubtedly the essence of many transactions involving notes, bills, bonds, leaseholds, land contracts and so on, although in some cases it may be implicit and more or less obscured by the nominal terms. It is not manifest, as a rule, in the outright purchase and sale of land, buildings, equipment and other physical property, although in the still broader sense in which the economist uses the term discounting it is doubtless a phase of the valuation process here, even if not the controlling influence.

In dealing with this class of transactions the accountant has been singularly ineffective. Despite the fact that in most situations the element of discount is evident, or is disclosed by careful scrutiny or analysis, the accountant almost universally fails to recognize the discount as such and as a result overstates asset values and liabilities and neglects to adjust income figures systematically. The accountant is guilty of unduly stressing par or face value, the amount due at maturity; he is inclined to adopt an essentially legal point of view, ignoring the significance of market value, and thus proving himself to be at this point less discriminating than the economist, the statistician or actuary, or even the business man. At the best he seldom goes further than to admit that a discount, if recorded at all, is a dubious item and should be eliminated through the income or surplus account as soon as

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feasible—an attitude which really begs the question. The most discouraging feature of the situation lies in the fact that there is little prospect of marked improvement in the accounting for discount, particularly in view of the rules promulgated by the bureau of internal revenue. As long as the bureau refuses to permit the systematic accumulation of discount or implicit interest by the investor in bonds, notes, warrants, insurance policies, etc., there is comparatively little practical incentive for the development of improved accounting for such contracts.

The difficulty seems to be that the accountant chooses to ignore four closely related propositions, so evidently sound as to be almost axiomatic. These are:

1. All contracts involving the furnishing of money or an equivalent for an appreciable length of time bear interest, regardless of the nominal terms.
2. Neither the amount due at maturity nor the total of all amounts due under the contract is the true initial value or principal, except as a matter of coincidence.
3. All initial values or principals accumulate as a result of accruing interest to the extent that such accruing interest is not regularly met.
4. Discount, far from being "prepaid interest," is actually *unpaid* interest.

A so-called non-interest-bearing note or bill, for example, running for three months, is certainly worth less at the initial date than at date of maturity, and this difference is clearly interest. In other words there is really no such thing as a non-interest-bearing evidence of indebtedness, aside from some unusual transaction not on a commercial basis. In the very nature of the case any contract involving appreciable time and the use of funds exhibits the phenomenon of interest. The true initial principal, measured by the actual amount invested or the market value if the amount invested is obscured, is the discounted value of all considerations due under the contract. In the case of the ordinary bill this is simply the present value of the single sum payable at maturity. In the case of a bond it is the present value of the interest annuity plus the value of the sum payable at maturity; and in the long-term bond the first element may be much the more important in making up the total initial value. It is purely a coincidence if the present value happens to equal the lump sum due some years hence. The third proposition, as a matter of effective balance-sheet valuation, is subject to the

qualification that all conditions of risk, interest rates and so on are assumed to remain unchanged throughout the life of the contract. That such accumulation is logically earned income is a corollary of this proposition.

That discount—the difference between present value and value at some future date—is actually unpaid interest, not prepaid interest, should be evident. It may be all of the interest or only a part of it, depending on the nature of the contract, but in any event it is not prepaid, and hence it is not an asset of the borrower nor—at the outset—an earning of the investor. In fact it may well be urged that there can be no such thing as prepaid interest in any proper sense of the term. Suppose that A borrows \$1,000 and immediately “prepays” a year’s interest of \$60. The net effect is that A has borrowed but \$940, and at maturity, when he repays the loan, he is paying interest to the amount of \$60 on a principal of \$940. It is essentially impossible to prepay interest, as any attempted prepayment simply operates to reduce the amount of the loan.

It is not my intention to discuss in detail the significance of note and bond discount and its accounting treatment, especially as I have already expressed myself on this subject elsewhere quite fully.\* It is rather my purpose to indicate possible extensions of the recognition of discount into more or less uncharted fields. However, to avoid any misunderstanding as to the premises from which I am proceeding it may be well to outline the case for a treatment of note or bond discount on the borrower’s books, for example, which is consistent with the propositions and implications already presented.

Discount is the excess of par or maturity value over the actual investment or true initial principal. If the par value is credited to the main liability account the discount must be charged to a supplementary offsetting account, a contra liability account. This item is in no sense a true prepayment or an asset of any other type. To treat discount as an asset is to deny the very fact of discount—is to hold, in other words, that the borrower always obtains property equivalent to par or maturity value regardless of the rate of interest offered or other conditions. Discount should not be confused with commissions or other bona-fide payments for services constituting true asset charges. In the financial statement the effective liability at any time

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\*See *Accounting Theory*, pp. 415-423.

should be shown as the net accumulated value, the difference between the balance in the main account and its offset. The argument that the par or face value is the legal value which would become effective immediately in the event of bankruptcy or any forced liquidation, and hence should be treated as the true liability by the accountant, is weak for several reasons. In the first place it ignores the going-concern assumption, on which most accounting valuation is based. Second, it ignores the fact that in forced liquidation proceedings par values are seldom actually realized and that in any proceedings in equity it is doubtful if the court would disregard a large discount on a particular issue in determining a reasonable settlement among several classes of creditors. Third, it should be remembered that notes and other obligations can often be and are often retired by mutual agreement among the parties involved at less than maturity value. For example, in the case of notes paid before maturity, banks regularly accrue interest only to date of payment in calculating the amount due. As far as effect upon periodic income sheets and subsequent balance-sheets is concerned the ideal treatment implies a systematic accumulation through charges to interest and credits to the offsetting discount account. Preferably this accumulation should be by the interest method as this is the only plan which insures that the total charge to interest per period is a uniform rate on the net book value of the debt.

Turning now to the problem of extending the recognition of the discounting process beyond the limits of the ordinary note or bond situation (although even here, it should be remembered, the ideal treatment is still largely a matter of academic discussion), I wish to call attention briefly to five or six cases or situations. Let us begin with one of the weakest, from a practical point of view, payroll, labor cost.

It is often pointed out by the economist that the ordinary laborer, although owning no tools or equipment whatever, is nevertheless a capitalist in that he actually bears a part of the capital-furnishing burden. What is meant is that the employee, in contributing services to production appreciably in advance of payment therefor, virtually contributes part of the working capital, or, in other words, reduces the capital advances of the owners below the amount which would be needed were payment for such services to be made from day to day. The true labor cost, therefore, is not the total amount of the payroll, but its

discounted value; and the difference between this value and the amount actually paid is a cost of capital, or interest. For example, suppose that the X Co. pays its employees once each month (assuming, for the sake of simplicity, that the arrangements with all employees are the same) and that the total payroll is \$1,000,000. If, now, it be assumed that the services of the employees have been acquired in a uniform manner from day to day, that, in other words, there have been no serious fluctuations in the stream of labor during the month, we have here an average capital contribution by the employees of roughly \$500,000 for one month, or, more accurately, the actual cost of labor per se is the payroll of \$1,000,000 discounted for one-half month at an appropriate rate. Assuming that the average cost of working capital to the company is six per cent. per annum, this means that the value of labor furnished is \$997,500, and that the difference between this charge and the total payroll, \$2,500, is in effect interest on the working capital implicitly furnished by the employees.

What, if anything, would be the significance of the adoption of this analysis by the accountant? At the most it would mean the transfer of a relatively small amount from labor-cost accounts to interest charges, charges more appropriately viewed as a disposition of net operating revenue than an expense incurred in creating gross; and on the whole the refinement would scarcely seem to be worth the additional effort required. However, in many cases a special statistical study of the payroll situation might well be undertaken from time to time, designed among other things to bring out the point just made. Certainly the management should be keenly alive to the effect that payroll methods have on working-capital requirements.

The error in the conventional treatment of accounts payable is perhaps more serious in amount, as the trade creditor is often required to wait longer for his money, following delivery of goods, than is the typical employee, and the average total outstanding in accounts payable is usually much larger than the average accrued payroll. Otherwise the two situations are closely comparable. Undoubtedly a considerable part of the working capital required by many enterprises is furnished continuously by the short-term creditors. The amounts charged to purchases (ignoring our old friend, the problem of cash discounts) are not restricted to actual cost of materials; they include an element of interest. In this case again the face or maturity value, which is definitely stated

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and hence is easily available, is substituted for the discounted initial value and the interest factor is thereby obscured.

A closely related example of discounting is implicit in accounts receivable. Again we find the accountant substituting a future face value for true present value. Perhaps the accounts on the average run for thirty days or more but on the books their value is maintained unchanged throughout their history (aside from adjustments for bad debts or other special adjustments) even if two or more accounting periods are involved. Nevertheless we all know that accounts due and immediately collectable have a value in excess of other charges due thirty days hence. In ignoring discounted present values we are in effect overstating sales and receivables, an error which is followed by the omission of a corresponding element of interest from earnings. To illustrate, suppose the X Co.'s account sales for one month total \$5,000,000, net, and that the average account runs for one month before collection. Under the conventional treatment this situation is recorded by charges to book accounts of \$5,000,000 and credits to sales of the same amount. If the accounts were discounted at a six per cent. rate, the treatment would be, roughly, as follows: (1) charges to book accounts of \$4,975,000 and corresponding credits to sales; (2) charges to cash of \$5,000,000 accompanied by credits to book accounts of \$4,975,000 and to interest earned of \$25,000. Or, if it were desired to emphasize face values in accounts receivable as a matter of convenience, it would be possible, through the use of a contra asset account, accounts receivable—unearned discount, or other appropriate title, to charge book accounts with the full amount, the contra discount account being later closed into interest earned.

A practical difficulty in the way of applying this method of treatment to the individual account receivable lies in the fact that the actual date of collection of the particular account can not be forecast accurately. Undoubtedly it would not be expedient to go further than a periodic blanket adjustment with such accounting, assuming that even this were deemed to be worth while. Whether or not any formal accounting is attempted in this direction it may again be urged that it is important that the management be definitely apprised from time to time of the amount of revenue which may logically be imputed to capital in the hands of trade debtors at the expense of the sales account.

Many of the larger banks have finally accepted the fact of discounting in their treatment of commercial paper (except that they list the unearned discount as a liability, instead of a contra to assets, in the balance-sheet), although a large number of institutions still adhere to the practice of taking discounted paper on their books at face or maturity value, the discount being credited immediately to income. Few if any concerns outside the banking field, however, have taken this leaf from the book of sound banking practice. Even concerns accepting from customers large amounts of time paper carrying no rate of interest or a rate less than the market rate attaching to the type of paper involved substitute par or face value for effective present values, and, where discount subsequently becomes evident through the sale or discounting of the paper, make matters worse by charging the discount to interest.

This case is sufficiently important to deserve careful consideration in terms of an example. The R Co., let us suppose, is distributing motor cars and frequently accepts notes from customers. Many of the notes bear explicit interest but in the case of ten- to thirty-day paper, it will be assumed, the company often accepts non-interest-bearing instruments. If somewhat pressed for cash the company discounts paper received at the bank, but a good many notes are held by the company to maturity. In these circumstances let us assume that the company sells a car to Y for \$1,500, Y paying \$300 down and giving his thirty-day note, "without interest," for the balance. The conventional record of this transaction, assuming the note is discounted at the bank at a six per cent. rate after ten days, would be as follows: (1) charges to cash and notes receivable of \$300 and \$1,200, respectively, with a credit to sales for the total; (2) charges to cash and interest (or interest and discount) of \$1,196 and \$4, respectively, with a credit for the total to notes receivable (or notes receivable discounted). Instead the entries should be: (1) charges to cash and notes receivable of \$300 and \$1,194, respectively, and a credit to sales of the sum; (2) charge to cash of \$1,196 and credits to notes receivable and interest earned of \$1,194 and \$2, respectively. Or, if it be desired to emphasize face value and nominal amount of sales and at the same time indicate the correct situation these entries might be modified as follows: (1) charges to cash and notes receivable—face, of \$300 and \$1,200, respectively, with a credit to sales unadjusted of the sum, supplemented by a charge to sales



discounts and a credit to notes receivable discounts of \$6; (2) charges to cash and to notes receivable discounts of \$1,196 and \$6, respectively, and credits to notes receivable—face, and interest earned of \$1,200 and \$2, respectively.

In a case where a note bore interest but had a present value of less than face the problem would be the same in principle. However, in this situation the difference between face and discounted value would often be so slight as to make it impracticable to recognize the discount prior to actual discounting at the bank. When discounting occurred, nevertheless, it would be more logical to charge sales discounts than an interest account.

The use of discounted values rather than face values for commercial paper acquired from customers, following good banking practice, would seem to be a sound procedure. Surely it is advisable, in accepting a note in lieu of cash, that the note be recorded, net, on an actual cash basis. Otherwise revenues and assets are for the time being overstated, and an interest earning accruing later is entirely obscured. It is now generally agreed that it is unreasonable for the car dealer, for example, to recognize secondhand cars taken in on sales at any figure above net sale value, regardless of the nominal allowance granted the customer. To do otherwise results in an overstatement of revenue from new-car sales and throws a loss on the used-car department that does not properly lodge there. Similarly to base sales revenue upon future rather than present values of evidences of indebtedness clearly inflates sales by the amount of a financial earning and in addition throws this earning in part at least into the wrong period. It must be remembered that there is usually available an organized market for commercial paper through orthodox banking channels, which means that there is no serious difficulty in the way of determining precisely the present value of the paper received. In the case of such an asset as used cars, on the other hand, it is only possible to estimate an approximate net sale value.

The contrast between book accounts and recognized forms of commercial paper in this connection is clear. Theoretically book accounts also should be discounted, but since there is no organized market through which accounts can be liquidated at a reasonable rate of discount, present value is distinctly an estimate and may, as a practical matter, be ignored. Were, however, the use of the trade acceptance generally substituted for that of the

open book account—a development for which there is much to be said—the question of discounting would become a practical issue throughout the field of credit sales.

The land contract furnishes another example of the importance of discounting in setting up proper initial values on the books, either in the case of payee or payor. In some communities land contracts are freely bought and sold and are a major asset in the case of many small finance companies as well as in the case of many individual investors. In these circumstances, naturally, the approximate rate of discount applicable to sound contracts is ascertainable, and it is feasible for the individual acquiring a contract on a nominal basis other than market value to discount the contract and set up a logical and conservative accounting.

To illustrate the situation in the case of an original payee, let us assume that A sells B a piece of land which had a cost and book value to him of \$35,000, at an agreed price of \$40,000, B paying \$8,000 down and agreeing to pay the balance in quarterly instalments of \$800 each, with interest at six per cent. According to the conventional face-value treatment in this case (and ignoring the possibility that A might decide for income-tax purposes not to recognize the contract as such as an asset, and follow the instalment method of determining income) A would charge the contract on his books at \$32,000, and recognize a profit of \$5,000. But is this sound, assuming the discounted value of the contract, as determined by reference to an organized market, is \$27,200, or fifteen per cent. less than face? Evidently not. Accordingly A should charge the contract account with only \$27,200, with a resulting credit to income of only \$200. Or, if desired, the use of a contracts-face account, charged with \$32,000, modified by a contracts discount, credited with \$4,800, would be appropriate.

If, now, A sells the contract on the market at \$27,200 there would be no loss or profit on this sale, which is as it should be. Under the face-value treatment, however, the sale of the contract would result in the recognition of a loss of \$4,800, when as a matter of fact there has been no loss, on the sale of the contract. If the contract has a fair market value of \$27,200, it is folly to place it on the books, net, at \$32,000. To do so means a clear inflation of assets and the recognition of an item of income which is extremely questionable, to say the least, and not subject to correction (except indirectly, over a considerable period) in the event that A continues to hold the contract.

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The later treatment of the contract on A's books, assuming that he does not sell, is of interest. Two somewhat distinct methods of procedure are open to him. He can accumulate the discount systematically throughout the life of the contract, or the period of holding, applying the yield rate of interest implicit in the initial valuation; or he may discount the contract anew each period. The first method has the advantage of being highly systematic, and requires no further reference to market values, but it involves rather troublesome calculations. The second method has the special advantage of recognizing the appreciation that naturally arises as a contract becomes more and more seasoned and the risk is reduced; in other words, it involves the use of a declining rate of discount with the shortening life of the contract.

To conclude this sampling of special situations involving discounting I will consider briefly two cases of contractual prepayments, insurance and leaseholds. To illustrate the application of discounting to the cost of insurance let us assume that the X Co., which closes its books quarterly, pays a three-year fire-insurance premium on the first of the year amounting to \$1,090.75. This happens to be the present value of a quarterly annuity of \$100 for a period of three years at a rate of one and a half per cent. per quarter. The entries at the outset and at the close of the first quarter, viewing the cost of the policy as the present value of this annuity, would then be as follows: (1) charge to insurance policy and credit to cash of \$1,090.75; (2) charge to insurance cost and a credit to insurance policy of \$100, at end of first quarter; (3) charge to insurance policy and a credit to interest earned on policy of \$16.36. In addition it might be deemed desirable to close the implicit interest against the book cost of \$100. By this scheme, evidently, the net insurance cost would be increased systematically from \$83.64 the first period to \$98.52 in the twelfth, which compares with a uniform charge of \$90.90 under the conventional method of apportionment. Or, the position may be taken that the actual insurance cost per period is \$100, and that the implicit interest arising from the treatment of the insurance premium as an investment should be credited to income rather than being closed against insurance cost.

To illustrate the similar situation in the case of a leasehold let us assume that X Co. acquires a tract of land from Y Co. for twenty-five years, paying therefor a lump sum of \$21,482.18, in lieu of periodic rentals or other consideration. This is equivalent to a

semi-annual rental of \$1,000 at eight per cent. interest convertible semi-annually. Applying the treatment already indicated in the case of insurance the entries at the end of the first six months would be as follows: (1) charge to leasehold and a credit to interest on lease of \$859.29; (2) charge to rent cost and a credit to leasehold of \$1,000. If desired, also, the interest element might then be closed against rent cost to show the net effect of the contract. Under this procedure, evidently, the charge to rent cost is the same each period, not an unreasonable assumption if the property and its use are substantially unchanged throughout the term of the lease, but the earning on the investment, the leasehold, an expiring asset, steadily diminishes.

Can it be said that such an asset actually produces income? The argument for the affirmative would run somewhat as follows: The lessee would certainly not tie up such a sum in an unproductive form. The leasehold is an investment, an earning asset, although the amount of the earning is somewhat obscured by the fact that no explicit payment in the form of a periodic rental is required. But it is not difficult in a given case to discover what the annual or semi-annual rental would be, and it is hardly fair to hold that by paying a lump sum in lieu of such rentals the lessor is actually reducing periodic expense. If as a matter of convenience and assurance to either or to both parties payment is made in advance, the amount the lessee can afford to pay is the present value of the periodic rentals determined by applying a rate roughly equivalent to the average rate that the lessee expects to earn on its funds. This operation does not reduce the amount of the periodic cost. The situation is essentially the same as if the lessor actually allowed interest on the deposit and the funds so earned were then used, together with the amortization of the deposit, to meet periodic rent costs. And from the viewpoint of correct cost and income accounting the interest accruing on the deposit should not be canceled against true rent cost.

This conception of the leasehold may appear to approach the theory that implicit interest on all funds invested in business should be charged to operating expense. This theory has never received the official endorsement of the American Institute of Accountants or any other responsible group of accountants as far as I know; nevertheless it has been advanced very persistently in some quarters. It may not be fantastic at this point to suggest that the doctrine that implicit interest accruing on a concern's

own funds tied up in business operation is a cost (and also an earning, of course) is at least consistent, if not identical, with the rather extreme use made of the conception of discounting by some economists. If the machine is actually a bundle of future uses, known in amount, it is natural to conceive of the cost of the machine as the present value of these uses or services. Thus the machine becomes an investment in a series of money payments or their equivalent, a series of hires, and the true cost from period to period is the actual value of each service as it materializes. The investment in the machine, on the other hand, is earning interest at the rate implicit in the original discounting.

However, it seems to me that a very clear line can be drawn to limit the application of the process of discounting in analyzing and recording business transactions. The province of discounting is after all a very narrow one. It is only legitimate to apply this process, as stated in my definition at the outset, to situations where *future sums, payable in money or its equivalent, are assured by contract*. In constructing a building or in buying a machine the business man is not actually acquiring a definite series of values, certain to be realized. There is no contractual implicit interest here. The enterprise expects to use its assets in business operation and hopes to make sales of product sufficient to recover all explicit commitments and to provide an adequate return on all funds invested. But the proof of the pudding here lies in successful operation. Business assets in general are not analogous to a note, a land contract, or other instrument providing for the payment of one or more precise sums at definite dates in the future.

The leasehold is undoubtedly a border-line situation. Specific uses of property are assured by contract, it is true, but the condition of the property may be altered with the passage of time and the current price of the use may change from period to period. Further, the final result of the use of the property, in the form of genuine earnings in cash or equivalent, is by no means assured in advance. On the whole it is probably sounder in this case, if the annuity method of amortization is employed, to treat the interest credit as a reduction in book cost rather than as a true income item.

In presenting this rather rambling discussion of special applications of the discounting process I have had no desire to advocate bizarre or impracticable methods of accounting at any point.

Through a consideration of a number of loosely connected types of situations, however, I have tried to indicate that conventional methods of accounting for these situations leave something to be desired and should be carefully scrutinized from time to time with a view to their improvement.