

LETTER TO THE EDITOR

DISCOUNTED CASH FLOW ANALYSIS

Sir,—Critical scrutiny of the premises and methods of orthodox economic analysis can only have beneficial effects for the science, but it is disturbing to see the attack on orthodoxy generating unfounded criticisms of the standard methodology.

Discounted Cash Flow analysis seems to have received a few undeserved knocks in recent years, and some of these are brought to mind by Lachlan Hunter's "One Forest, One Steward, One Treasurer" (*N.Z. JI For.*, 26(1): 9-13 (1981)).

In all cases where the DCF method is thought to "fail" the failure proves to be a failure of interpretation, or a failure to apply the method correctly, rather than a failure of the method as such. Inflation complicates DCF analysis and not infrequently causes the less experienced analyst to reach wrong conclusions but there is no doubt that there is a perfectly valid DCF method for dealing with the phenomenon. Similarly, the conjunction of loan and equity capital in a project in the overall context of a depreciating currency can create real headaches, but again the methodology is there to deal with it.

"Multiple solutions to IRR calculations" is sometimes claimed to invalidate IRR analysis, and yet close inspection does not uphold this claim. Multiple solutions arise when (often unbeknown to the analyst) hypothetical external elements are confounded with the project under study, and hence the very term "internal rate of return" is inapplicable to the results.

The "contradiction" pointed to in the article, where the market behaviour of a bond is contrasted with that of a forest, is in fact based on fallacy. A "bond yielding 7% which matures in five years' time" will lose value overnight "if a comparable instrument appears yielding 10%", but so will a forest five years short of maturity lose value in the event of any such sudden movement in the discount rate. The prospective buyer who previously required only that his investment yield him 7% p.a. through to harvest will now want 10%. Since Nature fixes the yield (*ceteris paribus*) this can only mean that he must pay less for the forest to achieve the higher rate of return — *i.e.*, the forest has been devalued.

The claim that "virgin forest exploitation yields an infinite internal rate of return" will be met with justifiable scepticism by

those in the business. Infinite rates imply zero capital, and that simply does not square with any kind of logging.

The problems that exist in DCF analysis are not due to inadequacies of the methodology, so much as errors in its application and interpretation. Nevertheless, now would probably be a good time for an in-depth study of the premises and methods of DCF analysis, and its implications for New Zealand forestry in an era of economic change and uncertainty.

G. FISCHER.

Reply by L. A. J. Hunter

Considering Mr Fischer's points in the sequence he presents them:

- (1) The "perfectly valid DCF method" for dealing with inflation (assumption of equally inflating costs and revenues) is presented in standard texts at home and overseas (e.g., p. 4 *Investment Appraisal in Forestry*, Busby and Grayson; Appx. I, *Financial Evaluation of Forestry Projects*, Fraser, Tustin and Zsumidlo) and is not questioned in my comment. Its relevance is. Notwithstanding the "real" nature of the rate determined by the DCF analyst, the decision-maker's required rate of return, if derived from interest rates swollen in the manner described by Mr White, will quite inexorably incorporate inflationary expectations into the decision. There are only two logical steps involved, and those who would believe that discount rates are determined by methods of pristine theoretical purity must explain the correlation with interest rates for themselves.
- (2) The possibility of multiple solutions to IRR calculations was deliberately excluded from my comment because the great rarity of its occurrence makes it of little consequence in forestry project appraisal.
- (3) My comment on the mutability of interest rates is based on methodological similarities between financial and forest assets. Consequently, I entirely agree with Mr Fischer that the forest will be devalued if a prospective buyer requires a higher rate of return through to harvest. The relevant paragraph expresses incredulity that the forester, through his "bare-ground" analyses, could regard the forest as behaving differently. One must, however, beware of confusing volumetric with financial yield, even under the catch-all assumption of

"*ceteris paribus*". Changes in price, rotation length, harvesting costs, etc., can all affect forest values irrespective of "Nature's" views on the matter.

- (4) There is no need to comment on virgin forest exploitation since this is already answered in the original article by the provision that "felling revenues exceed logging costs"; clearly the cost of capital may infringe this condition, in which case stands will not be logged, but just as the *Larix dahurica* still growing in Siberia testifies to this influence, so too the remaining rimu in New Zealand are ample historical testimony of the converse condition.

Finally, Mr Fischer addresses only a few of the misgivings about DCF analysis recently debated. Probably little purpose would be served by a Kantian argument upon whether faults lie within the analysis or the analyst, but in all cases the consequences for decision-making will stem from how the analysis is *actually* conducted. Nevertheless, readers will note that some differences between my view and Mr Fischer's would disappear if he were to accept that the manner in which discount rates are determined were part and parcel of the whole methodology, or if I were to accept that it was not.