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A RECONSIDERATION OF NET PROFIT AS A MEASURE OF FINANCIAL SUCCESS IN FARMING*

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1. INTRODUCTION

Net profit is commonly used in farm management studies for the measurement of financial success and for the appraisal of farming practices. The net profit used for such studies is generally that shown in the farm balance-sheet but with certain adjustments for the purpose of comparison. Warner¹ and also Garrett² have recently pointed out that adjustments normally regarded as sufficient do not in fact result in a reliable estimate of the true financial position of a farm and therefore fail to provide a suitable basis of comparison between farms. This is because some capital expenditure items, for reasons which are partly unavoidable and partly a matter of convenience, are included with working expenditure in the profit and loss account, thereby depressing estimated net profit. Both writers have suggested further adjustments which allow for this mis-allocation of expenditure in farm accounts and those of Garrett, which provide for greater precision, are adopted in this paper for calculations of the true net profit.

The paper firstly itemizes the adjustment normally made to the balance-sheet net profit, secondly, examines the reasons for mis-allocation of capital expenditure and expands the method outlined by Garrett for estimating the true net profit, and finally presents a statistical comparison of the two measures of net profit for a group of 39 farms.

2. THE ADJUSTMENTS USUALLY MADE TO THE BALANCE-SHEET

The main use of a net profit figure in farm management studies is for purposes of comparison. The principal requirement is that the method of net profit evaluation is the same for each farm under review. The following are the adjustments normally made to the balance-sheet net profit for this purpose.

1. *The exclusion of any income or expenditure item not directly related to the particular farming enterprise, e.g., receipts from other enterprises or investments, income and expenditure relating to a farmer's outside contracting activities and the receipt of rent for land not farmed by the owner.*

2. *The exclusion of any income or expenditure items not relating to the production period under review.* There are two main reasons why certain income and expenditure items may not relate to one particular production

* It should be noted that all Legislation and the specific procedures referred to in this article relate to New Zealand.

† The writer is indebted to J. W. B. Guise, H. E. Garrett and other colleagues for their help in the preparation of this paper.

¹ A. O. Warner, *Fat Lamb Farming in Southland 1952-53/1956-57*, N.Z. Meat and Wool Boards' Economic Service, Bulletin No. 6.

² H. E. Garrett, *What is Efficient Management*, Canterbury Chamber of Commerce, Agricultural Bulletin No. 376, Nov., 1960.

period. The first is simply due to an overlapping of production and accounting periods. In New Zealand production processes fall naturally into a seasonal period extending from winter. The balancing of accounts on March 31³ generally results in the inclusion of some items of income and expenditure from two production periods and makes all the more difficult the observation of relationships between expenditure and income. It is generally impracticable to adjust balance-sheets to allow for these anomalies unless a single enterprise system of farming like dairying is under review. In the latter case at least, the income may be adjusted to a seasonal basis.

The second reason concerns anomalies in accounting due to legislation. One of these is the result of the N.Z. Wool Proceeds Retention Act, 1951, which provides for the proceeds "frozen" from wool sold during the 1950-51 season to be withdrawn by growers in annual instalments over the five years from 1952 to 1956. Withdrawals appeared in farmers' annual accounts as income during those years for income tax purposes. Another anomaly arose when the N.Z. Land and Income Tax Act of 1944 (section 6) made provision for the recording, as expenditure, of moneys set aside for maintenance work deferred because of wartime shortages of materials.⁴ These moneys were deposited with the Inland Revenue Department and when withdrawn and used for maintenance work the amounts were entered simultaneously in the farm accounts on both sides of the profit and loss accounts.⁵ Each of the anomalies involved the re-allocation of income and expenditure to the years when they were incurred.

3. *The exclusion of capital expenditure items which have been incorporated in the profit and loss account.* Capital expenditure may be included in the calculation of balance-sheet net profits for two reasons. Firstly, certain costs of land development are deductible for income tax purposes.⁶

- (a) Eradication and extermination of animal and vegetable pests.
- (b) Felling and clearing bush, scrub and undergrowth.
- (c) Cultivating, topdressing and grassing new land.
- (d) Drainage.
- (e) Erection of new fence lines and rabbit-proofing.
- (f) Construction of access tracks.
- (g) Construction of dams, wells, bores and waterpipes.
- (h) Earth works for irrigation, flood control, and erosion control.
- (i) Formation of airstrips for aerial topdressing.

The amounts which may be deducted under items (a)-(c) are unlimited while the maximum deduction allowed under items (d)-(i) is £300.

Secondly, some expenditure items appearing in the profit and loss account are actually of a composite nature and include both capital and operating costs. For example, expenditure on fertilizers comprises both developmental as well as maintenance elements. Where high rates of fertilizers are

³ The end of the financial year in New Zealand.

⁴ Deductions for deferred maintenance ceased after March 31, 1955, with the passing of the Land and Income Tax Amendment Act of 1955.

⁵ Provisions involving similar adjustments to farmers' accounts are those of section 130-136 of the Land and Income Tax Act, 1954, regarding Snow Loss Reserves.

⁶ Section 119 Land and Income Tax Act, 1954.

applied soil fertility status is likely to be increased with consequent increase of productive capacity and value of the property. The category of expenditure called repairs and maintenance provides a similar example when an asset is restored to more than its original value. For purposes of accounting it is found expedient to include as wholly operating expenditure all of those items from which the capital portion is not easily isolated.

The possibility of adjusting net profit for this capital expenditure is limited. When capital costs are legally deductible for income tax purposes they are generally identified in the profit and loss account and may be readily deducted. In the other cases there is rarely any clue from the accounts as to the proportion of expenditure which is capital. It will be shown later that inability to distinguish certain of the capital expenditure items with regard to land improvements may result in the understatement of the true net profit by normal accounting methods.

4. *The inclusion of any unpaid factors used in the operation of the farm.* The main item here is the owner's labour and management which is generally calculated on an "opportunity cost" basis comprising standard rates of pay for the particular farm duties carried out and a further amount for the owner's managerial duties, commonly assessed as a fixed rate of the gross income, or farm capital involved.

There is a further unpaid factor, that of the farmer's own capital involved in the farm business. For comparative purposes there are two ways of dealing with farm capital: (i) the farmer's own capital involved may be considered as a loan to the farm business and charged at current rates of interest which are added to *actual* interest payments, or (ii) all interest payments may be eliminated from farm expenditure.⁷

If rent is regarded as a charge for the use of the capital embodied in land and improvements, it may be treated in exactly the same way as interest payments on loan moneys. That is, it may be (i) left as an expenditure item to which is added the imputed cost of the farmer's own capital involved or else (ii) deleted entirely.

If the alternative (i) above is adopted it is necessary to standardize the valuation of assets, adjust all payments on loan moneys to the same interest rate and standardize rents paid in order to preserve comparability. In practice this would involve the deduction of all interest and rent payments and the charging of a common rate of interest on total farm capital.⁸ This leads on to the next adjustment required.

⁷ It is sometimes required to obtain the net profit when all factors except one have been charged to the farm business at current market rates. The residual net profit is then expressed as a percentage or ratio of the factor under consideration. An interest return on capital may be calculated by adopting the alternative (ii) above. The resultant net profit, after making all other necessary adjustments may be expressed as a percentage return on total farm capital. This method of calculating the returns to a single factor is known as residual imputation, and the theoretical shortcomings of the method are discussed by Heady, *Economics of Agricultural Production and Resource Use* (New York: Prentice-Hall, 1952), Chap. 13.

⁸ New Zealand farm management studies have commonly relied on property valuations made by the Valuation Department. These values are assessed on a uniform basis and are related to current market values.

5. *The revision of asset valuations where there is a discrepancy between book values and market values.* It is normal accounting procedure to adopt conservative standard prices for livestock and cost prices less depreciation for the value of plant, buildings and land. It must be stated in explanation that any theoretical merits of using current market valuation are heavily outweighed by the inconvenience that annual revaluation would involve, and expediency dictates the almost universal adoption of historical cost valuation for normal accounting purposes. It is nevertheless considered necessary for comparative purposes to make the following adjustments to net profit on account of valuation discrepancies.

(i) *Plant and buildings.* It is accounting procedure to include in operating expenditure the depreciation of farm plant and buildings due to normal operation of the farm business. Instead of revaluing the plant at the close of each accounting period it is customary to depreciate the values at standard rates. However, for purposes of providing temporary taxation relief, the New Zealand Government has, from time to time, allowed increased depreciation rates, known as *initial* and *special* depreciation, to be deducted. For the purpose of standardization it is necessary therefore to adjust net profit for initial and special depreciation already charged to the profit and loss account. There may still be a discrepancy between the calculated standard depreciation and actual depreciation of plant but this is not likely to be serious.

(ii) *Livestock.* As changes in livestock inventory are also reflected in net profit it is necessary to adopt standard current market values throughout and to adjust each farmer's net profit accordingly.

(iii) *Land.* That the changes in value of land present special problems requiring additional adjustments to net profit will be discussed in the next section.

To illustrate the adjustments described in this section Table I shows the calculation of adjusted net profit. The data are from one farm included in a survey of 39 properties on the Burnham-Aylesbury area of Lismore (New Zealand) soils and the period covered is the five years 1954-55 to 1958-59.

3. CALCULATION OF TRUE NET PROFIT

It is a feature of farm accounting that some expenditure items which are classified as working expenses do in fact add to the value of the farming asset and therefore partly of a capital nature. The example of annual topdressing making a contribution to the productive capacity of the land and of so-called repairs restoring depreciating assets to more than their original value has already been given in the previous section. It was also noted that in most cases the capital portion so eludes measurement that for practical purposes the whole of the expenditure is recorded as a working expense.

For this reason quite substantial improvement in the actual value of a property may be effected by good husbandry methods without a corresponding increase being recorded in book values of the improved assets. It will be appreciated also that the capital portion of such expenditure has been entered as a charge against annual income giving a deflated evaluation of net profit which may then be quite inaccurate as a measure of the true trading position of a farm.

TABLE I

Usual Adjustment for Calculation of Net Profit

	£	£
Total Income from Profit & Loss A/c.		28,864
<i>Less—</i>		
(a) Income not from period under review (includes wool retention and deferred maintenance withdrawals) ..	1,168	
(b) Revaluation of livestock (resulted in a reduced balance of stock A/c.)	880	
	2,048	
Adjusted income		26,816
Average per annum		5,363
Total Expenditure from P. & L. A/c.		9,496
<i>Add—</i>		
(a) Allowance for unpaid factors—		
(i) Wages of management		4,219
(ii) 5½% total farm capital		6,475
		20,190
<i>Less—</i>		
(b) Expenditure not within period (as a result of changed date of balancing accounts during 1954-55 season)	650	
(c) Special and initial depreciation	1,074	
(d) Rent and interest payments	386	
	2,110	
Adjusted expenditure		18,080
Average per annum		3,616
Adjusted net profit £5,363-£3,616		£1,747

The relationship between the *true net profit*⁹ and that shown by the accounts may be represented symbolically, as follows:

$$\begin{aligned}
 NP_A &= I - (E_W + E_C) \\
 NP_T &= I - E_W \\
 &= NP_A + E_C
 \end{aligned}$$

Where I = Total farm income

E_W = Working expenditure

E_C = Capital expenditure included with working expenditure for accounting purposes.

NP_A = Net profit from the accounts.

NP_T = True net profit.

There is no way of measuring E_C directly but this is unnecessary if a revised balance sheet is drawn up summarizing the change in actual market value of assets and liabilities over the period being reviewed. Net profit is nothing

⁹True net profit is defined as the net increment in value of assets of a business over a period, so that the above equations are only valid under conditions where cost of capital improvements equals the resultant increase in market value. This relationship rarely holds even though it is commonly assumed in accounting procedure. The assumption that cost equals value is adopted here only for convenience of illustration.

more than a statement of net asset increment over a period and the necessity for adjustments in normal farm accounts arises from the failure of some forms of capital expenditure to be reflected in the book value of land and improvements.

The revision will consist of revaluing all assets, the book values of which have not followed market value on account of "hidden" capital expenditure, unrealistic depreciation rates and the adoption of standard values for livestock. Further adjustment required will be those already discussed in section 2, namely (i) the exclusion of any income or expenditure not related to the farm or to the period under review, (ii) the inclusion of any unpaid factors used in the operation of the farm and (iii) the inclusion of rent and interest payments for purposes of comparison.

The calculation may be illustrated by using data from the same farm for which adjusted net profit has already been estimated. The details of this are shown in Table 2.

4. A COMPARISON OF THE TWO ESTIMATES OF NET PROFIT

For the purpose of making comparisons of financial efficiency between farms, how important is the fact that working expenditure, as normally defined for accounting purposes, may include more or less "hidden" capital expenditure? Where development is taking place on a farm, so-called "working expenditure" will be inflated with a greater proportion of capital expenditure. This will have the effect of depressing the apparent net profit whilst a "hidden" increment in the value of the property, not recorded in the balance sheet, takes place. Under these circumstances the true net profit should give a more accurate assessment of financial efficiency, particularly where farms are at varying stages of development.

Although true net profit gives a more accurate measure of the absolute level of financial achievement among farmers it is possible that the usually adjusted net profit may still be useful for ranking farms according to achievement. For this purpose a comparison of the two measures was carried out for the thirty-nine properties on light plains land mentioned earlier. A graph (Fig. 1) comparing the true net profit and the net profit with usual adjustments show that there is a high correlation between the two measures, but that there exists a considerable margin of uncertainty if adjusted net profit is used to predict the true net profit. The correlation coefficient is .92 but the standard error of estimate of Y , £1,220, indicates that from a given value for adjusted net profit, the true net profit can only be estimated with 95 per cent certainty to within \pm £2,440 (twice the standard error of estimate). It is clear in this case that adjusted net profit does not account for sufficient variation among true net profit to serve as a reliable alternate index for financial success.

Although these conclusions relating to thirty-nine farms do not necessarily apply generally, they show the need for a critical examination of farm accounts when used for comparison of financial success.

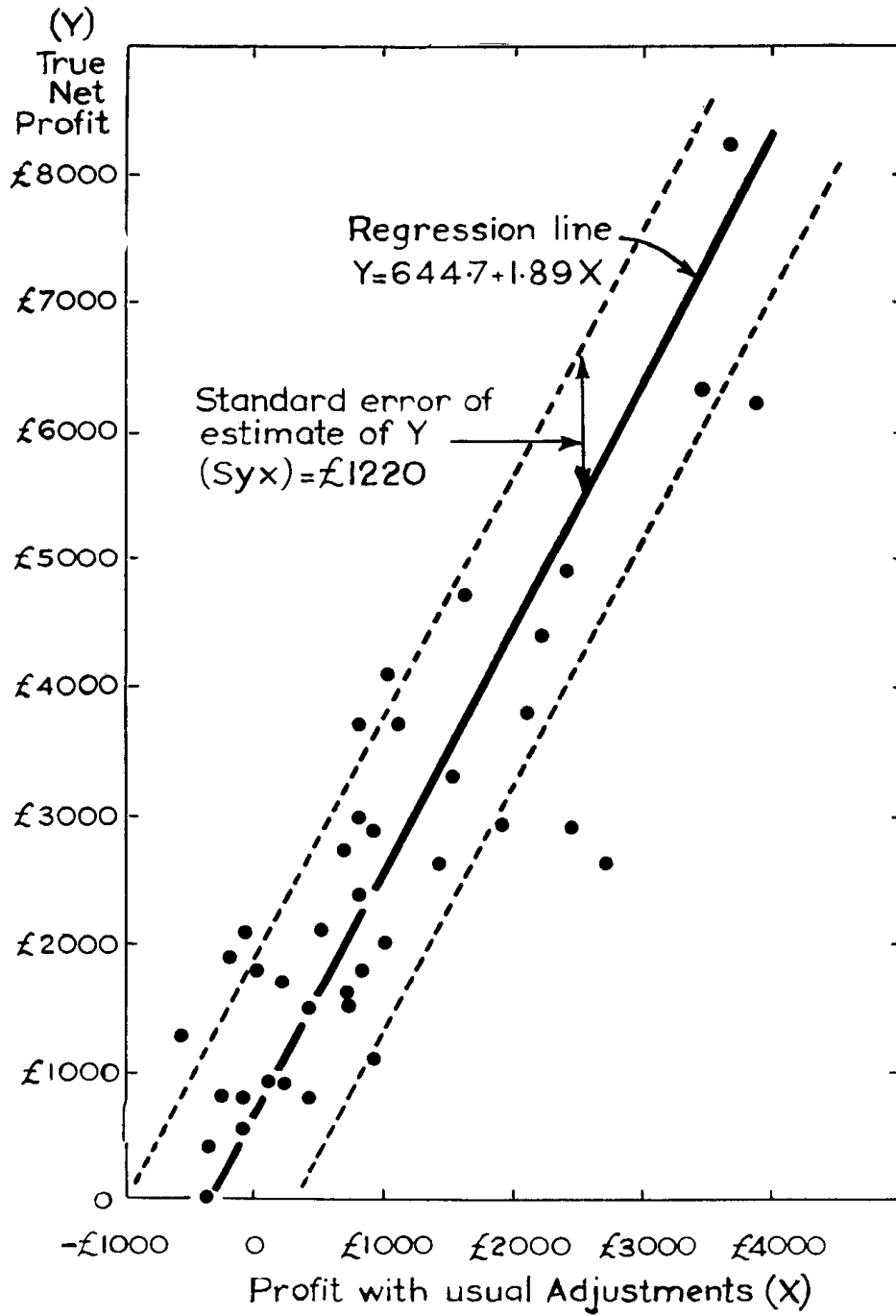


Fig. 1. True Net Profit and Net Profit with Usual Adjustments for a Group of 39 Light-land Sheep Farms, 1954-59.

TABLE 2

Revised Balance Sheet for Calculations of True Net Profit

	£	£
Liabilities at beginning		1,561
Assets at end*		29,611
Adjustments:		
(1) Non-farm income and introduction of Capital period	2,431	650
(2) Personal drawings, rent, interest and other payments included for purposes of comparison		13,369
		<u>45,191</u>
<i>Less</i>		
Assets at beginning*	19,787	
Liabilities at end	1,566	
Adjustments:		
(1) Non-farm income and introduction of Capital	2,431	
(2) Unpaid factors—		
(a) Wages of management	4,123	
(b) 5½% on total farm capital	6,475	34,382
True net profit—		
Total for 5 years		10,809
Annual average		2,162
Net profit (with usual adjustments, see p. 154)		<u>1,747</u>

*The assets at beginning and end have been revalued. Government valuation has been taken for the value of land and improvement. Livestock have been valued at prevailing market rates. Plant and machinery has been taken at book values adjusted for special and initial depreciation.