JOURNAL OF FARM MANAGEMENT VOL.13. NO. 8. PAGES 539-556

REFEREED PAPER

A COMPARISON OF NEW AND PREVIOUSLY PREFERRED MEASURES OF FARM INCOME

Jeremy Franks

Survey data is used to compare DEFRA's new preferred measures of farm income, Farm Business Income (FBI), Farm Corporate Income (FCI) and Farm Investment Income (FII), with their previously preferred measures, Net Farm Income (NFI) and Management and Investment Income (MII). For most (but not all) farms, FBI is larger than NFI and FCI smaller. FBI is a more useful measure of farm-business competitiveness than NFI whilst FCI is a more appropriate measure to use to compare profitability with companies along the food supply chain. FII is generally larger than MII and is a more useful measure of return to all capital employed. The discussion considers the use of these farm income measures, and then speculates on some possible new income measures.

Key words: farm incomes, business performance, benchmarking.

Introduction

Following a consultation exercise, DEFRA decided to redefine the methodology it uses to record farm incomes (DEFRA 2007b). Its new preferred headline measure of farm income, Farm Business Income (FBI), replaces Net Farm Income (NFI) which becomes a secondary measure. It has also introduced Farm Corporate Income (FCI) and Farm Investment Income (FII) (which is now preferred to Management and Investment Income (MII)), and Tenant's Investment Income (TII). Occupiers Income (OI) will no longer be routinely reported. There has been no change in the methodology used to report cash flow measures.

This paper introduces FBI, FCI and FII. It compares them with NFI and MII, to show (1) the consequences of the change for recording the average prosperity of farm businesses and (2) any income distribution effects. The benefits and disadvantages of the change are then discussed, followed by speculation on measures of farm income which may usefully be developed for future use.

Definitions and uses

Table 1 shows the derivation of former preferred income measures, OI, NFI and MII, and the newer measures FBI, FCI, FII and TII.[1] Net Farm Income (NFI) is defined as "the reward to the farmer and spouse for their own manual and managerial labour and interest on tenant-type capital invested in the farm, whether borrowed or not" (MAFF 1978)[2]. It is firmly based on the assumption that farming is a separate activity to land (and building) ownership, in that the farm is treated as tenanted by the deduction of rents for

1. DEFRA publishes a large number of farm business income measures but "largely for reasons of continuity has given prominence to NFI" (DEFRA 2006: p 14).

2. Tenant-type capital comprises livestock, machinery, crops in store, stocks of consumables, work in progress, orchards, other permanent crops, glasshouses, cash and other assets needed to run the business. It does not include land and buildings.

Table 1. Derivation of previously and newly preferred farm business income measures

		Old measures			New measures			
		Occupiers Income	Net Farm Income	Management & Investment Income	Farm Business Income	Farm Corporate Income	Farm Investment Income	Tenant Investment Income
Total revenue		plus	plus	plus	plus	plus	plus	plus
Separable non-agricultural diversified income		minus	minus	minus				
Total variable costs		minus	minus	minus	minus	minus	minus	minus
Total fixed costs		minus	minus	minus	minus	minus	minus	minus
Farm Profit		equals	equals	equals	equals	equals	equals	equals
Notional charges	Unpaid family manual labour	minus	minus	minus		minus	minus	minus
	Rent on owned land		minus	minus				minus
	Improvements to landlord-type assets*		minus	minus				minus
Net interest payments			plus	plus			plus	plus
Any ownership/landlord-type charges paid by farmer**			plus	plus				plus
Paid management				plus				
Unpaid farmer and spouse manual labour				minus		minus	minus	minus
Unpaid farmer and spouse managerial labour						minus	minus	minus
		=OI	**=NFI**	**=MII**	**=FBI**	**=FCI**	**=FII**	**=TII**

* owned by the tenant, these include for example, buildings, drainage.

** these include such costs as insurance of farm buildings and landlorf type repairs

owner-occupied land and other landlord-type assets. NFI was not designed therefore as a measure of profitability, though it is often used as an index of profitability. Its principal merit is as a consistent like-for-like measure for comparing farm-to-farm performance.

Several important but gradual changes in the agricultural sector have reduced the usefulness of NFI as even a proxy measure of profitability and for its use in comparing farm performance. These changes include changes in sources of farm-income, a gradual but long-term change in tenure arrangements, an increase in overall sector debt, with a higher proportion of farms in debt, and an increasingly important weakness in its conceptual basis - caused by the rising proportion of management undertaken by people other than the farmer and spouse[3]. Each is considered in turn.

A change common to all new measures is the decision to include income from all diversified activities. The situation is well explained by documentation submitted with the notification of the review of farm income measures: "Separable diversified non-agricultural turnover/output/revenue and costs were excluded from the old measures of farm income. This is because these measures were intended to cover agricultural production and a limited range of diversified non-agricultural activities. However, in practice it was not possible to exclude all the costs of the excluded diversified non-agricultural activities, and since the output from them was excluded there was a tendency to underestimate income" (DEFRA 2006: p. 33). It is therefore likely the main consequence of this change is that reported farm incomes will increase *ceteris paribus*, as previously excluded sources of income are likely to be larger than previously disallowed costs.

Trends in land tenure and the increase in owner-occupation mean that the rational for continuing to conceptually separate owner-occupier from tenant costs has been eroded, making it increasingly difficult to justify subtracting imputed rental charges for owner-occupied land. Moreover, new tenancy arrangements have also blurred the traditional distinction between tenants and owner-occupiers. For example, a recent report stated "the growth of farming another's land through the use of contracts or share farming arrangements appear to be on the increase. Significantly more changes have been accomplished through the use of unconventional forms of tenure than FBTs" (RICS 2008: p. 6). Clearly, dividing the costs of maintaining landlord-type assets between parties has become more difficult, providing a pragmatic reason for changing the methodology used to calculate farm incomes.

Moreover, NFI assumes that farms are debt free, so no paid interest is deducted or interest dividend received credited. However levels of debt are continuing to rise, having increased from £10.3 billion in 2003 to £11.4 billion in 2006 (provisional figure) increasing the interest paid from £450 million to £581 million, with a further estimated increase to £680 million in 2007 (DEFRA 2007a). These expenditures make it increasingly difficult to justify ignoring such a large and very real cost at the farm level.

NFI also suffers from a conceptual problem. As stated above, it assumes

3. An additional justification for making these changes is to more closely align the farm-based measure with the aggregate measure of income Total Income from Farming (DEFRA 2007c).

the farmer and spouse are the sole proprietors, but now apparently one in four full-time farms have other partner(s) besides the principal farmer and spouse – with an average work input of one full-time equivalent (DEFRA 2006: p. 29).[4] To report the return to the farmer and spouse, a notional value for work of these other partners in the business must be deducted, but NFI estimated only a value for their manual and not their managerial input, so it represents more than the return to only "farmer and spouse".

Management and Investment income represents 'the return to the farmer and spouse and employed management for management and interest on tenant-type capital invested in the farm'. It is derived by adding back to NFI any paid managerial costs and deducting an imputed value for farmer and spouse's own manual labour. It therefore also assumes that farms are tenanted and that all tenant-type assets are owned by the farmer (i.e. that there are no borrowing or interest payments) and so suffers from some of the same shortcomings as NFI.

The principal new measure of farm income is FBI. FBI is defined as "the return to all unpaid manual labour and management (farmer, spouse, farmer's family and others with an entrepreneurial interest in the farm business) and to all their capital [i.e. net worth] invested in the farm business including land and farm buildings". FBI makes no notional deductions. It records only rent actually paid and all interest payments received and charged, and includes income from all diversified activities. As such, it better summarises the competitive position of the farm vis-à-vis other farms than NFI.[5] As it does not deduct a value for labour it avoids the problem of estimating appropriate values which may under- or over-value actual private drawings. This means, however, that FBI must not be used to represent farm profit in the sense this word is used in corporate businesses.

Moreover, as FBI makes no deduction for family, farmer or spouse manual and managerial labour, it should not be used to compare farm income with incorporated business income, which is the typical business form for firms supplying goods to farming and buying farm produce. Incorporated firms deduct payments for all manual labour and managerial contributions by business employees and owners, allowing net profits to represent the return to capital, risk and entrepreneurship. However, around 95% of farm businesses are sole traders or partnerships for whom accounting conventions are different (DEFRA 2006). But because the distribution of the farm-gate and retail price mark-up between actors in the food supply chain has become increasingly politically charged, a need has developed for a measure of farm income that could be used in like-for-like comparisons with incorporated firms. Therefore a new (secondary) income measure, Farm Corporate Income (FCI), has been introduced to meet this requirement. FCI subtracts from FBI an imputed value for all unpaid manual and managerial labour[6] to represent the financial return on shareholder's capital invested in the farm business.

4. Information contained in documentation explaining and justifying the recent review of farm income measures.

5. "The term *Farm Business Income* rather than *Net Profit* gives an indication of the measure's farm management accounting rather than financial accounting origins… it is intuitively recognisable to uses as a measure of farm income" (DEFRA 2007c: p 4).

6. That of the farmer and spouse, family and others with an entrepreneurial interest in the farm business.

Farm income is not equivalent to wage income. To use a farm income measure for such a comparison it would needs to be decomposable into returns to labour, capital and land. FCI can be divided by net worth to give a percentage return on (owned) capital employed. Adding net interest payment back to FCI gives FII. This represents the return to all capital invested in the business so when divided by total assets gives the percentage return on all capital employed. Although MII reports a return to management and tenant-type capital, it has often been used to calculate a rate of return to farming. FII ought to replace MII for such calculations.

Deducting from FII landlord-type ownership charges and a notional rent for owner occupied land results in TII, which when divided by tenant's assets gives the percentage return on tenant-type capital. The focus of these new measures of return to different bundles of capital (net worth, all capital employed and tenant-type capital) is a major benefit of the new income measures.

Comparison of new and old preferred measures of farm income

This section presents several comparisons of the new and old farm income measures using data from a survey of upland farms (see Appendix A for details of the data-set used). It focuses on the most important measures, NFI, MII, FBI, FCI and FII.[7] Measures of central tendency and spread are presented and compared. Further distributional impacts are demonstrated by correlation statistics, histograms and scatter plots.

Table 2 shows these income measures for the "average" LFA farm in 2006/07. FBI at £10,786 records the largest value of all previously and newly preferred income measures. After deducting a value for all unpaid manual and managerial labour, FCI shows an income of minus £8,800, adding back (net) interest [previously deducted as a cost] raises FII to minus £7,143. NFI, at £6,111, is less than FBI but larger than FCI. The range in reported incomes is widened by MII, which is the lowest at minus £10,602. Clearly, the choice of income measure to represent performance has important implications for reporting farm business prosperity. This is further demonstrated by DEFRA's calculation of FBI for each year since 2003/04; in that year FBI/farm was £6,300 larger than NFI/farm. In the following three years it was £7,700, £9,200 and £10,900 greater (DEFRA 2007c: p. 2).

Table 2 also shows another key change, the reporting of farm income by four cost centres: agriculture, agri-environment (including Hill Farm Allowance (HFA)), diversification income and the Single Payment Scheme payment (SPS): which represent 54.5%, 14.4%, 4.1% and 17% of total farm revenues respectively. At the moment many fixed costs in particular are allocated to cost centres using standard coefficients; it is intended to move towards a more individualised allocation, as far as it is possible or sensible to do so, in the near future.

Table 3 compares measures of central tendency and spread. Unlike Table 2, these data are not raised to the population level. The FBI mean of £17,788 is considerably above that of NFI (£11,052), reflecting the additional revenue

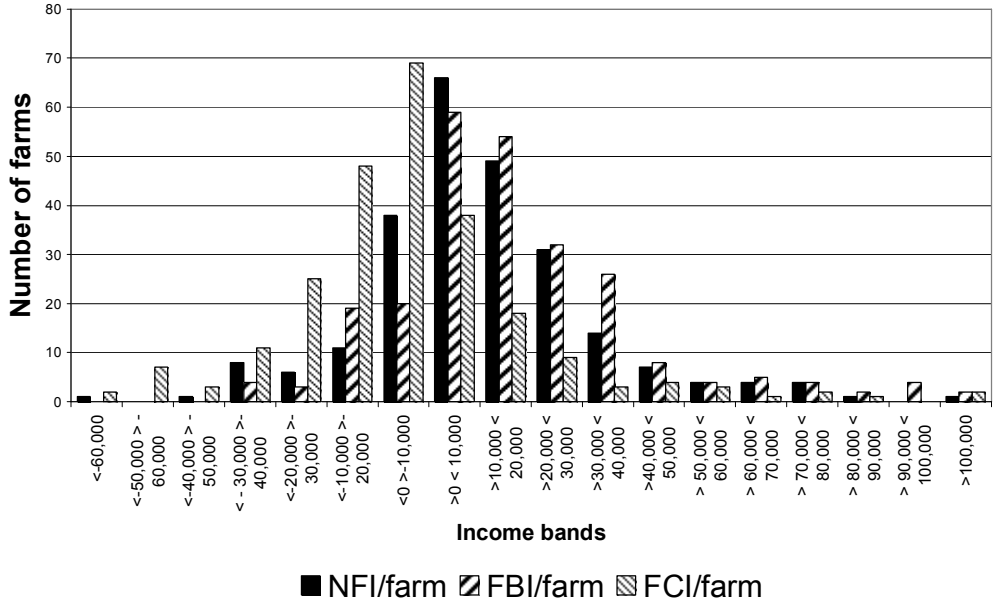
7. Tenant's Investment Income was not reported in the data set used for compiling this paper.

Table 2. Performance of "The Average Hill Farm", showing the derivation of DEFRA's new farm income measures (Farm Business Income, Farm Corporate Income and Farm Investment Income), and Net Farm Income and Management and Investment Income.

			Cost Centre (£ per farm)		
	Agriculture	Agri-environment	Diversification out	Single Payment	Farm Business
		and other payments	of agriculture	Scheme	(£ per farm)
Derivation of farm income measures:	2006/07	2006/07	2006/07	2006/07	2006/07
Total output	33,958	8,995	2,530	16,835	62,318
Variable costs	20,724	43	338	0	21,106
Total Gross margin	13,234	8,951	2,192	16,835	41,213
Fixed costs	29,519	468	641	39	30,668
Total Costs	50,243	512	979	39	51,773
Profit/(loss) on sale of fixed assets	241	0	0	0	241
Farm Business Income	-16,044	8,483	1,551	16,796	10,786
Adjusted for unpaid manual and managerial labour	18,770	321	495	0	19,586
Farm Corporate Income	-34,814	8,162	1,056	16,796	-8,800
Interest payments (net of interest received)	1,589	7	58	0	1,654
Farm Investment Income	-33,224	8,169	1,114	16,796	-7,146
Derivation of Net Farm Income				Profit/ (loss) on sale of assets	241
				Imputed rent	5,606
				Ownership charges	2,608
		Non-agricultural output historically not accounted for in Net Farm Income			596
		Non-agricultural inputs costs historically not accounted for in Net Farm Income			346
			Unpaid labour of principal farmer and spouse		16,746
				Net Farm Income	6,111
			Holding gains not included in farm income		50,657
			Breeding and Live Stock Appreciation (BLSA)		1,282
		Revaluation of machinery, permananet crops, glasshouse, quota			420
				Revaluation of land	48,954
			Management and Investment Income		-10,602

(Number of farms: weighted 5,724, unweighted 246).

Figure 1 Histograms comparing the distribution of new and old farm income measures.



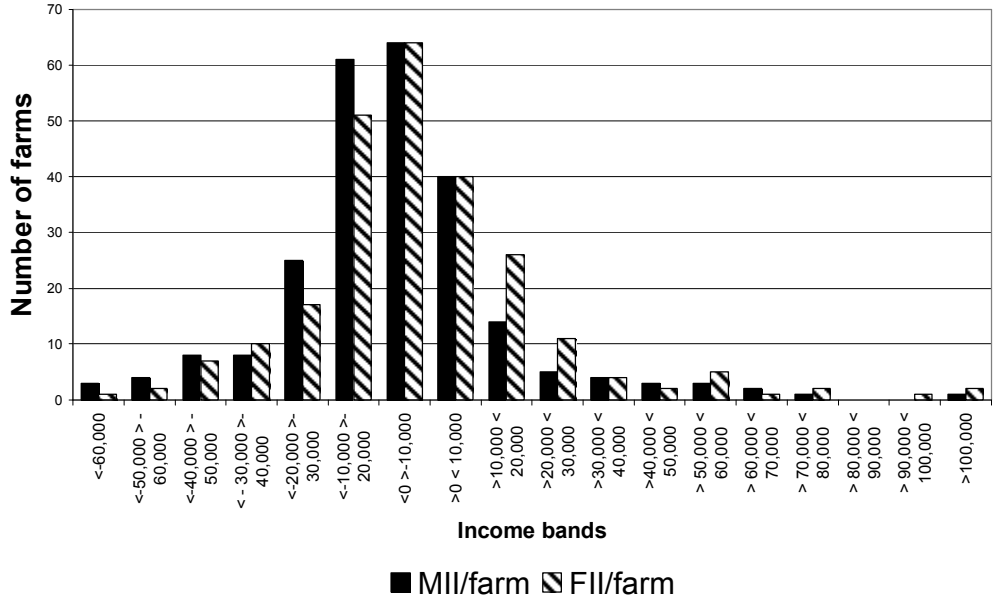


Table 3 Descriptive statistics for new and old farm measures of farm income.

		Mean	Median	Standard Deviation	Minimum	Lower Quartile	Upper Quartile	Maximum
New measures	F B I	17,788	14,112	27,298	-37,831	3,448	26,999	212,436
	F C I	-4,406	-4,406	26,452	-79,519	-16,584	-16,584	164,286
	F I I	-2,182	-5,014	26,260	-78,541	-14,476	5,303	162,934
Old measures	N F I	11,052	8,885	23,148	-64,446	-1,165	20,657	145,330
	M I I	-6,638	-7,681	23,774	-95,546	-17,701	2,028	152,130

recorded, and the net impact of excluding notional charges and adding net interest payments and landlord-type charges. Clearly the additional income and fewer costs outweigh the extra net interest payments and landlord-type charges. FCI is recorded at minus £4,406, and FII at minus £2,182 can be compared with the previous measure of return, MII, which is minus £6,638. Therefore, for this sample of farms, the new preferred headline measure of farm income, FBI, is £6,736 higher on average than NFI, and FII is £4,456 higher than MII.

Figure 1 compares the distribution of new and previously preferred income measures. Compared to NFI/farm, FBI/farm has shifted the distribution to the right whilst FCI/farm has moved it to the left. FII/farm appears to be larger than MII/farm, a shift which reflects more changes at the extremes of the distribution than at its centre.

The change in ranking of individual farms can be indicated by the Spearman correlation between the new and old measures and the Kendall tau_b test (Table 4). A correlation coefficient of +1 would indicate that the measures were the same or equally different on all farms. All the Spearman and Kendall tau_b correlations were significant at the 0.01 level. The Spearman correlation coefficients were all high, for example 0.9067 between FBI and FCI. However, this is smaller than the correlation coefficient of 0.9470 between NFI and MII, suggesting the new preferred measures contain more "information" than the previous preferred measures. FBI has a correlation coefficient of 0.7639 with NFI and FCI has a correlation coefficient of 0.8331 with MII: both lower than the new and old measure comparisons, and suggestive of the importance of the definitional changes to a reasonably large minority of farms.[8]

Figure 2 plots new and old farm income measures to focus more closely on the inter-farm distributional consequences of the change in headline farm income measures. The headline farm income of all those farms below the 45 degree line will be higher when using the new (FBI/FCI/FII) rather than the old (NFI/MII) measures. Relatively few farms in the top graphs are above the 45 degree line but those that are tend to be clustered towards the low end of

8. Kendall's tau_b test results are presented in Table 4 to give support the findings of high correlation between new and new and old preferred income measures

Table 4 Spearman correlation coefficients and Kendall's tau_b test results between farm income measures.

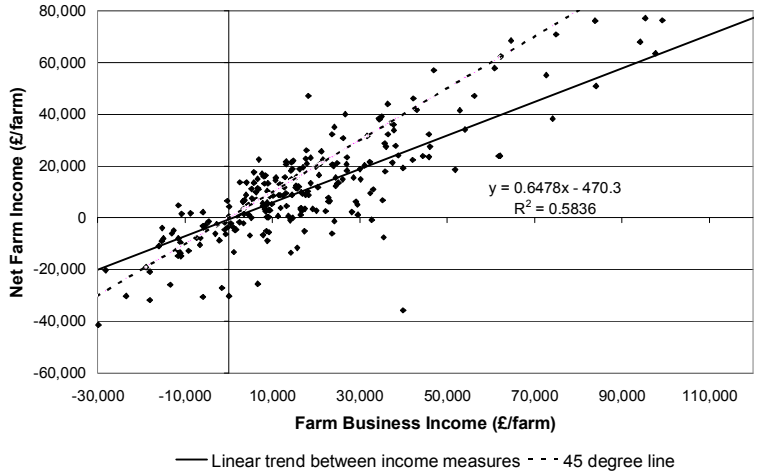
Pearson's correlation coefficients				
	FCI	FII	NFI	MII
Farm Business Income (FBI)	0.9067	0.8953	0.7639	0.7034
Farm Corporate Income (FCI)		0.9843	0.7959	0.8331
Farm Investment Income (FII)			0.8184	0.8512
Net Farm Income (NFI)				0.9470
Management and Investment Income (MII)				
All are significant at the 0.01 level				
Kendall's tau_b test results				
	FCI	FII	NFI	MII
Farm Business Income (FBI)	0.67	0.642	0.615	0.531
Farm Corporate Income (FCI)		0.891	0.598	0.690
Farm Investment Income (FII)			0.632	0.73
Net Farm Income (NFI)				0.632
Management and Investment Income (MII)				
All are significant at the 0.01 level				

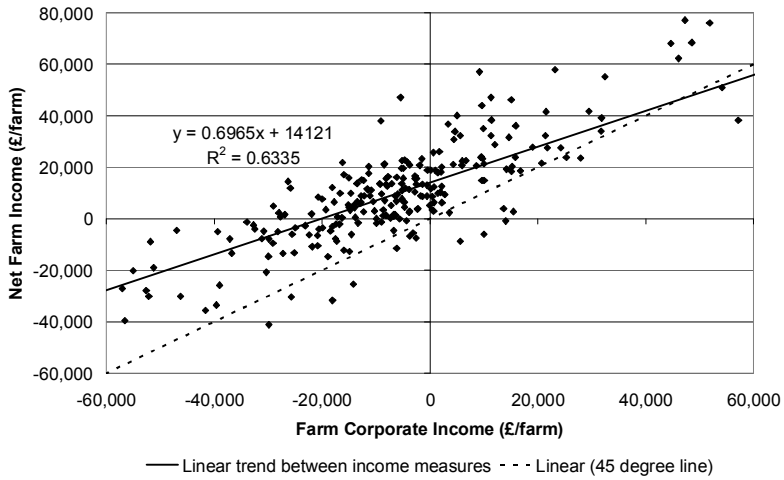
the NFI distribution. The reported relationship shows that NFI is on average 65% of FBI. Relative few farms are below the 45 degree line in the middle graph, showing that NFI is larger than FCI for almost all farms. The bottom graph in Figure 5 shows most farms are below the 45 degree line, indicating FII is larger than MII. Therefore, the comparisons presented in Figure 2 confirm the findings presented in Figure 1.

But any difference is perhaps better illustrated by examining the scatter-plots in Figures 3, 4 and 5. Figure 3 shows that most farms (162, 66%) record a positive difference (i.e. FBI is larger than NFI) and there appears no particular relationship with farm size. Figure 4 plots the difference between FCI and NFI with farm size, this time most farms (224, 91%) are "below" the X-axis indicating FCI is generally smaller than NFI, but again there is little relationship with farm size. In Figure 5 most farms (165, 67%) show a positive difference between FII and MII.

Figure 6 compares the newly preferred measures with each other, and the two previously preferred measures with each other. FCI differs a little more from FBI than MII does from NFI (R^2 values of 0.8222 and 0.8967 respectively), suggesting the two newly preferred series convey slightly more information.

Figure 2. Comparisons between new and previously preferred measures of farm income.





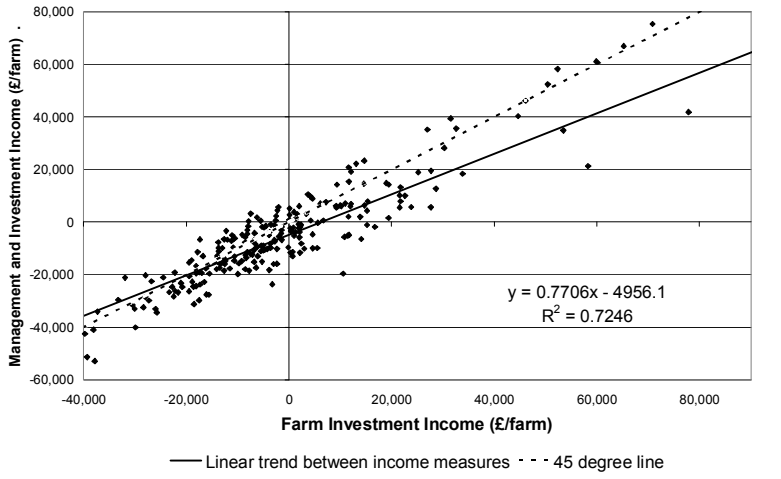


Figure 3. Graph showing the difference between Farm Business Income and Net Farm Income with farm size (GLUs).

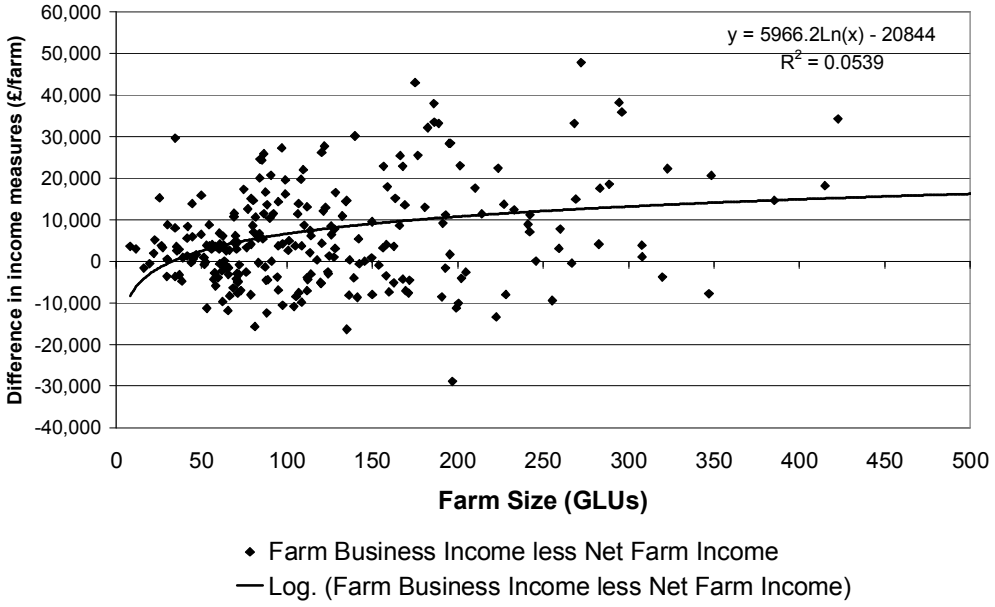


Figure 4. Graph showing the difference between Farm Corporate Income and Net Farm Income with farm size (GLUs)

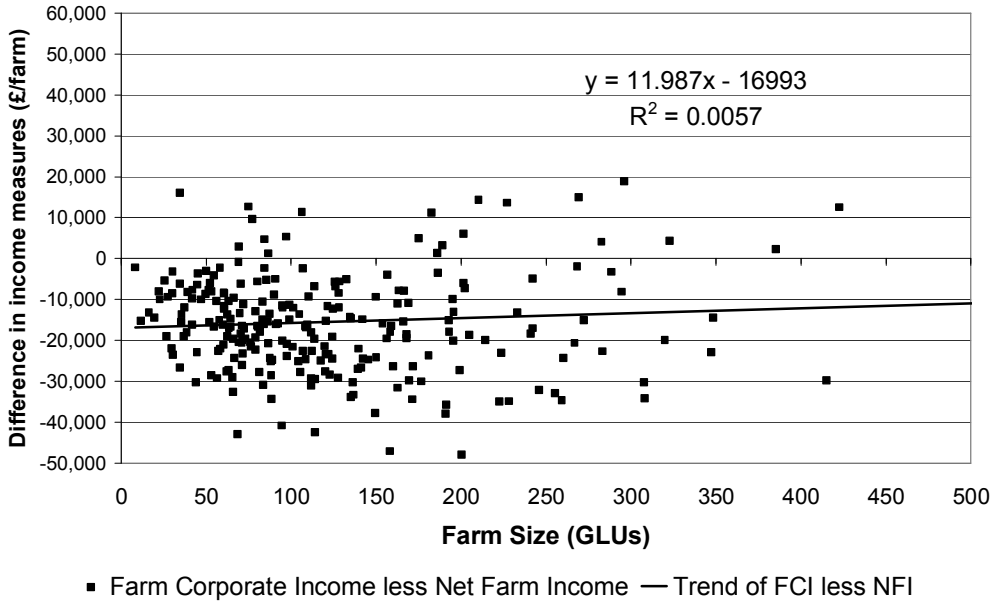
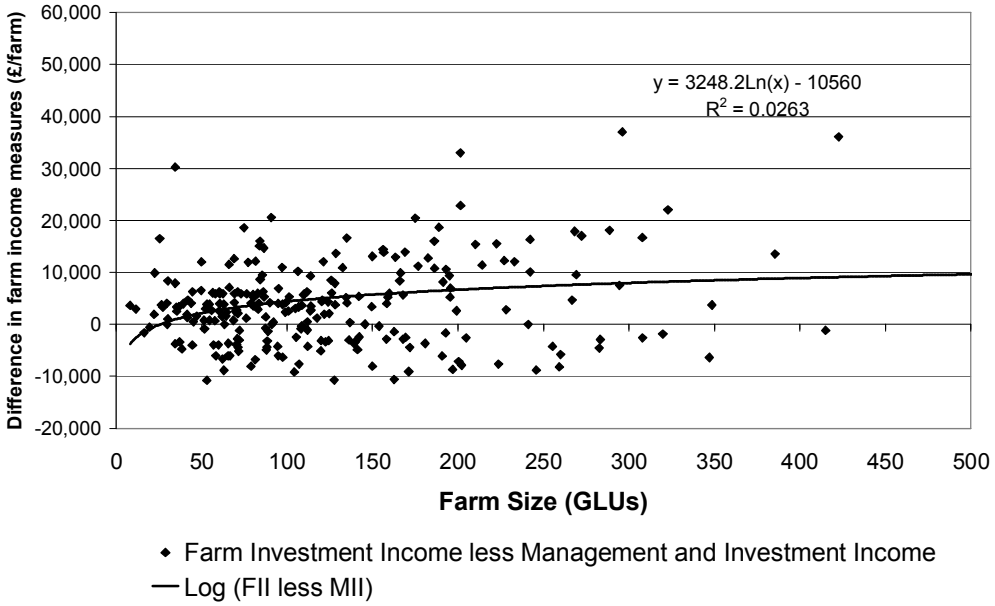


Figure 5. Graph showing the difference between Farm Investment Income and Management and Investment Income with farm size (GLUs).



There is a similar degree of difference between FII and FBI (R^2 values of 0.8015), but very little difference between FII and FCI (R^2 of 0.9688). Whilst conceptually both FCI and FII are important, this comparison suggests the two measures add little additional information to one another. This raises the question as to their value, and potential use: does the inclusion of two such similar measures indicate DEFRA has become more focused on inter-farm income distribution for example?

Discussions

The principal purpose of this paper is to bring to the attention the change in methodology used for reporting farm incomes and to consider some of the consequences of this change. Farm income measures are politically charged, they are regularly used to demonstrate that farmers are doing well or poorly, that current policy is successful or inadequate. In recent years, farm incomes statistics tend to strengthen the case for government support and consequently those who argue for stronger support are prepared to take them at face value. So what is clearly important is how these measures are used; that is what questions they will be used to answer.

The case for changing methodology, to accommodate the various long-term changes in the financial structure of farming discussed above, is clear. The substantial growth in diversified activity - which needs to be recorded on a consistent basis and included in farm income, land ownership and tenure arrangements, increase in debt and interest payments, and conceptual incomparability due to data issues have had a net effect of reducing the usefulness of NFI. NFI is a measure with a firm agriculture base. It was

Figure 6. Comparisons between the newly preferred and previously preferred measures of farm income.

founded on the notion that "since agriculture has no requirement to own land, the tenant component of owner-occupied farms is conceptually separated from landlord functions in its calculation." (DEFRA 2006: p 28). The principal impact of the new methodology is to move away from this notion and towards more appropriate measures of competitiveness and profitability.

The data presented above show that FII is greater than MII for most farms. However, it reflects the returns to all assets but no management, whereas MII represents the return to all management inputs but only tenant's assets. The majority of the value of agricultural assets are landlord type, so FII would need to be larger than MII to represent "similar" performance levels. Clearly, it is strictly inappropriate to compare FII with MII, they measure different things.

There are, therefore, substantial conceptual gains from these methodological changes but they do, nevertheless, retain some problems. Including non-agricultural sources of income might mislead with regard to the health of core agricultural activities at a time when food production *per se* is of particular interest (Chatham House 2008a; Chatham House 2008b). To avoid moving away from recording and publishing the cost of food production, published results must continue to be presented by the four cost centres set-out in Table 1 despite the difficulties encountered allocating fixed costs between enterprises. The difficulties are readily acknowledged by DEFRA and more work is continuing to make allocations more consistent and accurate.

Whilst FBI has removed the need to impute a value for manual and managerial family and farmer and spouse labour, both FCI and FII still require such imputed values (based on earnings for undertaking similar activities in alternative employment). As the basis of these calculations remain unchanged, they suffer from the same weaknesses as previously, namely the imputed deductions may bear no reflection on farmer's real opportunity cost or to their actual private drawings (RABDF 2005). It is not apparent that any other alternative methodology could feasibly be used.

New measures of farm income: Household Income

An important justification for public support of agriculture is the relative low incomes of farm verses non-farming families. The inclusion of all diversified income and placing costs on an as-paid basis produces a more accurate measure of farm performance and this can more accurately identify the less well-off farm. Therefore these new measures may be used to identify and target farms in the most straightened circumstances and to raise their farm incomes above a threshold: arguing that farms achieving returns above the threshold had chosen that particular lifestyle and so need no additional support.

Any change towards such a threshold policy would presumably require whole household income to be included - because understanding household income is certainly necessary to understand the competitiveness and viability of farms. Moves towards targeting threshold incomes might be unpopular

among the wider farming community though some clearly would benefit. There would be more opposition to a fully inclusive household income measures, implying as it does that non-agricultural activities would be expected to be used to subsidise the farm businesses. Targeting would shift attention to farm size because farm incomes tend to be lower on smaller farms. However, the evidence presented above does not suggest that these definitional changes have systematically biased reported farm-income with respect to farm size.

New measures of farm income: Rural Economy Interaction Index

The inclusion of all off-farm diversified income would reinforce the increasing importance agriculture policy places on the rural economy-farm business linkages. This linkage would benefit from a measure (or index) that illustrates this interdependence. The more widespread use of computers in farm and rural business accounts makes recording the total income and total expenditure conducted with "local" businesses, expressed as a proportion of total revenue and costs, feasible. Such a Rural-Agricultural Business Index (RABI) measure would be particularly informative for summarising the relationship between a thriving rural economy and a prosperous farming sector.

New measures of farm income: Farm and Environment Business Income

CAP support payments are increasingly focused on supporting the production of environmental goods (e.g. landscape and biodiversity) and reducing environmental bads (e.g. pollution). For example, payments are gradually being transferred from Pillar 1 to Pillar 2, to support environmental-based payments etc, and Single Payment Scheme (SPS) increasingly linked to land-use cross-compliance constraints. New measure, based on these new farm income measures, for example a Farm and Environment Business Income (FEBI) measure and a Farm and Environment Corporate Income (FECI) measure, would link financial and environmental performance.

There has been recent interest in developing such measures (Webster 1999; Buckwell 2005; EFTEC 2004). Such a measure would require judgements on;

- what environmental effects (changes in environmental flows and capital) should be studied and recorded,
- how the empirical results should be measured and presented,
- where there are gaps in data that are likely to be of importance, they need to be closed, and
- conceptual and methodological development in the financial valuation of environmental stocks and flows.

Though none of these are inconsiderable tasks, much of the data that might be needed is already collected for large areas of England. For example, a condition of receiving SPS in England is that the land the payment is attached

to has been recorded on the Rural Land Register. Field identity numbers, size and less favoured area status are recorded along with land use and changes in field boundaries. This has resulted in a digital record of farmland use and field patterns across England. Further data is available from each farm's Soil Protection Review (a cross-compliance condition of receiving the SPS). Farms enrolled in the Entry Level tier of the Environmental Stewardship Scheme (ESS) [9]need to submit a Farm Environmental Record – which include (i) maps of environmental features (hedges, ponds, ditches, trees etc), (ii) a Scheme Option Map - which shows the location and type of scheme options they intend to introduce and/or maintain, and (iii) a Soil Management Plan. Other popular ESS options include nutrient management plans and manure management plans, which require detailed records to be kept, as does the Nitrogen Vulnerable Area land designation, which has recently be extended to cover 70% of English farm land. Farmers within NVZs must record all manurial applications.

Therefore many of the data-systems needed to record levels and changes in environmental stocks and flows are in place, they could readily be developed and expanded where there are weaknesses in data collection. For example, there are currently plans for the ESS to be refocused towards combating green house gas production on farms, for example, by recording the farm's carbon footprint - perhaps by using a carbon calculator similar to the one developed by the Countryside and Landowners Association (Country Land and Business Association 2008). Where data gaps remain, for example recording mineral flows and balances, other systems could be developed, perhaps modelled on the Dutch Mineral Accounting System (Hanegraaf and den Boer 2003).

Integrating financial and environmental stocks and flows could be done by compiling physical measures rather than by estimating financial values of the environmental impacts of farming – which involves many additional conceptual and methodological problems. Such problems should not be allowed to hold-back measuring and recording environmental stocks and flows, which is now eminently feasible and a necessary first step to fully integrate environmental and financial measures of farm income.

Conclusions

The strongest argument for the change in preferred farm income headline definition is based on the impact of gradual changes:

- in farm business income earning activities,
- increasing debt burden in farming,
- ownership structure and tenancy arrangements, and
- in the labour and managerial input of family, farmer and spouse and other partners and directors (needed to achieve definitional coherency).

The analysis has used data from Less Favoured Area farms to show that

9. Farmers who have been accepted onto the Higher Level of the ESS need to submit a Farm Environmental Plan, upon which up to 180 types of environmental feature must be recorded. Though fewer farmers have enrolled for this tier, it shows that systems are in place to enlarge the range of environmental features recorded.

for most, but not every farm, the change in preferred farm income measure from NFI to FBI will return a higher reported income, and so reflect a stronger basis to farm business performance. This change may hamper efforts of the industry to attract additional compensation and support arrangements. However, FBI must not be allowed to represent farm profit, which is better proxied by FCI which is the more appropriate measure to use to compare profitability and return on owned assets with other firms in the food supply chain. And as these data show FCI to typically be less than FBI, farming should welcome these new measures whilst vigilantly policing their use.

These changes, and including all diversified income in the new preferred income measures, focuses on the competitiveness of farms. As such, there is a strong argument that other household income – because these might be used to support the farm business – should also be included, as this may help explain their continued existence. But compiling such a measure of farm family household income is likely to be unpopular among the farming community with its implication that off-farm income should be used to subsidise the farm business. One important advantage of including all household income into an income measure is to better record linkages between the rural economy and farm businesses. This would add important additional information to the debate over the relationship between farm businesses in the rural economy, which is becoming a more important justification for agricultural support payments.

One change that might be considered for future reforms to farm income measures, which has become more desirable with the switch in CAP support payments towards environmental conservation and protection, is the inclusion of environmental impacts with financial measures. Many building blocks are already in place to collect the necessary data but additional research would be needed to overcome valuation problems. Revisions to the ESS afford an opportunity to progress this suggestion.

Is there any evidence to suggest that this new methodology for reporting farm business incomes might herald a change in the way support payments are targeted? If so, then more research - using the entire Farm Business Survey sample – is needed to establish if FBI, FCI and FII are biased up or down with farm size; how they vary from year to year and between farm types; and at different stages in the farm business or national business cycles; and what are the implications for amending the existing relief for small farms, for example waving EU modulation on the first €5,000 of SPS.

About the author

Jeremy Franks (J.R.Franks@ncl.ac.uk) is a Senior Lecturer in Farm Business Management at the University of Newcastle. After a period working on his family's farm, he retrained as an Agricultural Economist at the Universities of Reading and Manchester. He has wide ranging research interests in issues relating to land use and environmental management, in addition to whole farm and enterprise financial analysis. He is currently researching issues related to the impact of global heating on climate change and farming's foot- and hoof-print.

References

Buckwell, A. (2005) Green Accounting for Agriculture. *Journal of Agricultural Economics* **56** (2): 187-215.

Chatham House (2008a) *Thinking About the Future of Food: Chatham House Food Supply Scenarios.* London.

Chatham House (2008b) *UK Food Supply.* Chatham House, London.

Country Land and Business Association (2008) *CLA CALM Calculator.* [Online] http://www.calm.cla.org.uk/.

DEFRA (2006) *Measures of Farm Income.*

DEFRA (2007a) *Agriculture in the UK 2007.* London.

DEFRA (2007b) *Consultation on Measures of Farm Income.* [Online] statistics.defra.gov.uk/esg/asd/fbs/consult.htm.

DEFRA (2007c) *Farm Business Income, Net Farm Income and Cash Income by types of farm in England.*

DEFRA (2008) *Sample Representation and Design.* [Online].

EFTEC (2004) *Framework for Environmental Accounts for Agriculture.* Percy Street, London.

Hanegraaf, C., M. and den Boer, D., J. (2003) Perspectives and limitations of the Dutch mineral accounting system (MINAS). *European Journal of Agronomy* **20** (1): 25-31.

MAFF (1978) *Definitions of Terms used in Agricultural Business Management (Second edition).*

RABDF (2005) *Identifying the True Costs of Farmers Own Labour.* Leamington Spa, Warwickshire.

RICS (2008) *Trends in agricultural tenure in England and Wales 1990-2007.*

Webster, P. (1999) The Challenge of Sustainability at the Farm Level: Presidential Address. *Journal of Agricultural Economics* **50** (3): 371-387.

Appendix A. Data used for the comparisons

This paper uses data from sheep and cattle upland farms recorded in the Farm Business Survey (FBS). These livestock farms are classified as Less Favoured Area (LFA) farms because 50% or more of their total area is in the LFA. Of the sample, 68% of the 246 farms come from the EU North region, 21% from the EU West and the remainder from the EU East. The sample framework is randomised and stratified using ten robust farm types and seven government office regions, considers part- and full-time farms only, and surveys a total of 1,850 farm businesses. Within each stratum, sampling is with uniform probability: farm size is not explicitly included in the current design (DEFRA 2008). Farms are retained in the sample for several years with about 10% of the sample replaced each year – largely through natural wastage. All sampled farms have financial year-ends between 31 December and 5 April 2007.