Agricultural land prices statistics and indicators

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Introduction

This article gives an overview of the main statistical series available on current (and recent) agricultural land prices in England and, to some extent, Wales. It focuses on the most well-established series that are widely used by analysts interested in current land market conditions. The series that are considered are the 'official' statistics produced by the Ministry of Agriculture, Fisheries & Food (MAFF) in association with the Valuation Office Agency (VOA) and the National Assembly for Wales Agriculture Department (NAWAD),[1] the separate specialised valuation estimates that the VOA publish twice a year in *Property Market Report (PMR)*, (which is compiled differently from the 'official' series (see below)) and the data that the Royal Institution of Chartered Surveyors (RICS), publish. Other reports or data specifically focus on different segments of the market, e.g. those compiled by the Oxford Institute / Savills,[2] but are outside the scope of this article.

The existence of numerous well established data series is an indication that the land market is seen as an important aspect of the agricultural sector.It is also significant as an indicator of foreseeable profitability prospects in farming, because current prices will reflect, *inter alia,* expectations of net returns (or 'rents') to be earned from farmland (Walsh, 1997).[3]

The foregoing data series are designed to serve quite different purposes and are compiled in substantially different ways. This article attempts a brief comparison of the respective statistics for the period from 1993 to 1999. It considers whether at least some of them might be partly aligned to co-ordinate with each other in order to provide a focussed and up-to-date picture of agricultural land market developments.

The contents of this article and any comments expressed are the sole responsibility of the author and do not represent or necessarily reflect the views of MAFF.
g Note that terms marked are defined in the glossary.

The potential benefit would be that it could help to lay the foundation for developing a sensitive leading indicator for the official MAFF agricultural land prices. This indicator would be a barometer of prospective future developments within a certain time horizon in farming. This could also assist analysts and policy-makers in making informed assessments of prospects for the industry.

In the first section a brief outline of the main data series is given. As explanatory information on the MAFF data are readily accessible (e.g. on the website *www.maff.gov.uk* .),[4] attention in this section will be mainly directed at certain relevant non-MAFF market data sources. However one important aspect of the MAFF series is the timing factor. At present it is estimated that over half of transactions are likely to be included within nine months of the sale and the initial estimates for any quarter will therefore be published with a nine-month lag.

In the second part of the article the VOA *PMR* series are examined in order to conduct a comparative analysis with the MAFF data. The third section conducts a comparative analysis of the RICS series. In the fourth section methodological procedures are considered and suggestions made regarding the construction of short-term agricultural land price projections in the context of developing a leading indicator. A final section concludes.

Market Data Sources: outline

VOA's Property Market Report

The data and tables in this publication are compiled from the knowledge and opinions of the VOA's District Valuers and also from transactions data recorded on the Particulars Delivered forms (PDs, see footnote 4). Valuers analyse these forms based on their local knowledge of the farms and the background to the transactions in order to arrive at an opinion of value of a typical property type. The estimates that appear, e.g. in the tables on pp. 16 & 19, are not

directly empirical statistics. Some farms that are deemed to be representative or 'typical property types' are designated and their value is reconsidered every six months.

Where property specifications have changed, the representative type will be redefined to maintain the representation of the market, (although this does not occur frequently for agricultural properties). Hence the tables provide data (unweighted) that are valuers' estimates of the value of a consistent set (and subsets) of representative property types comprising fully equipped farms, (rather than prices paid for properties that have actually been sold).

RICS

In 1995 RICS initiated a new land price series which was intended to fill a gap left by the demise of the ADAS/AMC/CLA[g] series known as the CALP.[5] The overall RICS data represent the outcomes of actual sales and not updated judgements of general valuation, as in the case of the VOA *PMR* estimates. The data are recorded as prices agreed where contracts have been exchanged and comprise a range of transactions types.

Comparing VOA *PMR* and MAFF/NAWAD Data

The estimates published in the VOA's *Property Market Report (PMR)* relate to April and October, hence a semi-annual time series can be compiled. The average values in England and Wales are based on valuers' opinions formed at 49 locations for mixed farm land, 40 for arable land, 32 for dairy land, 17 for hill land. The published estimates are simple averages of all the reported locations in each region/ country. In a few instances there are no entries, which indicates that the farmland type is not typical in the area. The results are presented in the form of a typology associated directly with the foregoing locational groups.

Table 1 VOA *Property Market Report (PMR)*

Value of Agricultural Land with Vacant Possession
England & Wales

£ per ha.

	Type of Farmland			
	Arable	Dairy	Mixed	Hill
Apr. 98	8,358	8,245	7,304	3,006
Oct. 98	8,013	8,307	7,294	3,011
Apr. 99	7,709	8,030	6,936	2,932
Oct. 99	7,659	7,958	6,741	2,808
Apr. 00	7,585	7,808	6,674	2,717

VOA Weighted Agricultural Land Prices
England & Wales

£ per ha.

Components proportionally adjusted by weighting to be summed to provide the weighted total.

	Type of farm				Weighted Total Agricultural Land Prices
	Arable	Dairy	Mixed	Hill	
Half-year centred on					
Apr. 93	1,327	1,509	1,769	310	4,915
Oct. 93	1,350	1,531	1,787	313	4,981
Apr. 94	1,401	1,573	1,830	328	5,132
Oct. 94	1,494	1,626	1,912	327	5,359
Apr. 95	1,660	1,730	1,999	353	5,742
Oct. 95	1,892	1,753	2,023	382	6,050
Apr. 96	1,990	1,860	2,185	372	6,408
Oct. 96	2,204	1,973	2,360	396	6,934
Apr. 97	2,331	1,983	2,473	393	7,180
Oct. 97	2,383	2,019	2,551	411	7,363
Apr. 98	2,423	1,912	2,593	370	7,298
Oct. 98	2,323	1,926	2,590	371	7,210
Apr. 99	2,234	1,862	2,463	361	6,920
Oct. 99	2,220	1,845	2,394	346	6,805
Apr. 00	2,199	1,811	2,370	335	6,714
Mean (93 1 – 99 2)					6,307

Source: VOA Property Market Report, various issues

Consequently the data are disaggregated by broad type of farmland, namely arable, dairy, mixed and hill. The estimates for recent years for land values (vacant possession) are provided in Table 1.

In order to conduct a directly comparable analysis with the published MAFF-based statistical series, the data need to be converted on to a similar basis. The separate farmland type series in the VOA *PMR* are amalgamated into a composite overall series, by weighting the farm type data-sets by the proportion of the farms sampled in that type. This gives a combined (weighted) total for England and Wales, presented in Table 1

The MAFF-based series will be converted to a similar periodicity, i.e. semi-annual (by taking quarterly averages) up to the latest available which is end-1999. To enable overall comparability the published land prices figures for England and Wales can be combined. The land prices data are adjusted accordingly by taking averages weighted by areas. Unfortunately MAFF's quarterly series relate to 'All Sales' (AS), while that for vacant possession (VP) is available only annually. On an annual average basis for the period 1993 to 1999 the ratio of VP to AS transactions prices equals 101.59 per cent. The MAFF data can be adjusted accordingly. The results are presented in Table 2, which also includes the differences between these and the VOA *PMR* weighted prices.

It is apparent that the differences between the two series are substantial with the VOA *PMR* prices consistently higher than those for MAFF except the preliminary estimates for October 1999. This may be due in part to the inclusion of Welsh figures here in the official series, since they are regularly considerably lower than corresponding values for England.[6] Although the VOA *PMR* data is meant to represent England and Wales, because only a few Welsh locations are included and hence because it is difficult to reflect the underlying proportions.[7] Wales is actually under-represented in that series.

Hence to enhance comparability it was decided to exclude Welsh figures from the official series for this exercise. Thus a comparison will be made between the VOA *PMR* series and the calculated semi-annual MAFF estimates for England. These are presented in Table 3.1 and graphed in Chart 1.

It can be seen that the differences are sizeable and fairly consistent in direction. Moreover the patterns of movements of the respective series over time are quite different in that the VOA *PMR* series is much smoother. By contrast the MAFF estimates are subject to greater intra-year variability.[8] Therefore the VOA *PMR* estimates would be unlikely to be very successful as a leading indicator to forecast short-term movements over the general period.

However when the overall time-span is divided into two sub-periods, a contrast emerges. Taking the sub-period April 1993 to April 1996 (half the available observations) the mean percentage difference is

Table 2 MAFF & WAD Semi-annual Agricultural Land Prices* and Differences with VOA *PMR* Weighted Prices

Half-year centred on	MAFF/WAD All sales England & Wales Semi-Ann		MAFF/WAD Adjusted for Vacant Possession	VOA - MAFF/WAD (VP) Differences
				£ per ha.
		Ratio of V.P. to A.S.		
Apr. 93	3,545	1.0099	3,580	1,335
Oct. 93	3,808	1.0099	3,846	1,135
Apr. 94	3,848	1.0223	3,934	1,198
Oct. 94	4,321	1.0223	4,417	942
Apr. 95	4,040	1.0329	4,173	1,569
Oct. 95	5,153	1.0329	5,322	728
Apr. 96	5,176	1.0122	5,239	1,169
Oct. 96	6,349	1.0122	6,426	508
Apr. 97	5,862	1.0191	5,974	1,206
Oct. 97	6,549	1.0191	6,674	689
Apr. 98	5,603	1.0084	5,650	1,648
Oct. 98	6,430	1.0084	6,484	726
Apr. 99	5,862	1.0062	5,898	1,022
Oct. 99	6,974	1.0062	7,017	-212

* All Sales and adjusted for Vacant Possession

Sources: Agricultural Land Sales and Prices in England and Agricultural Land Prices in Wales, various issues

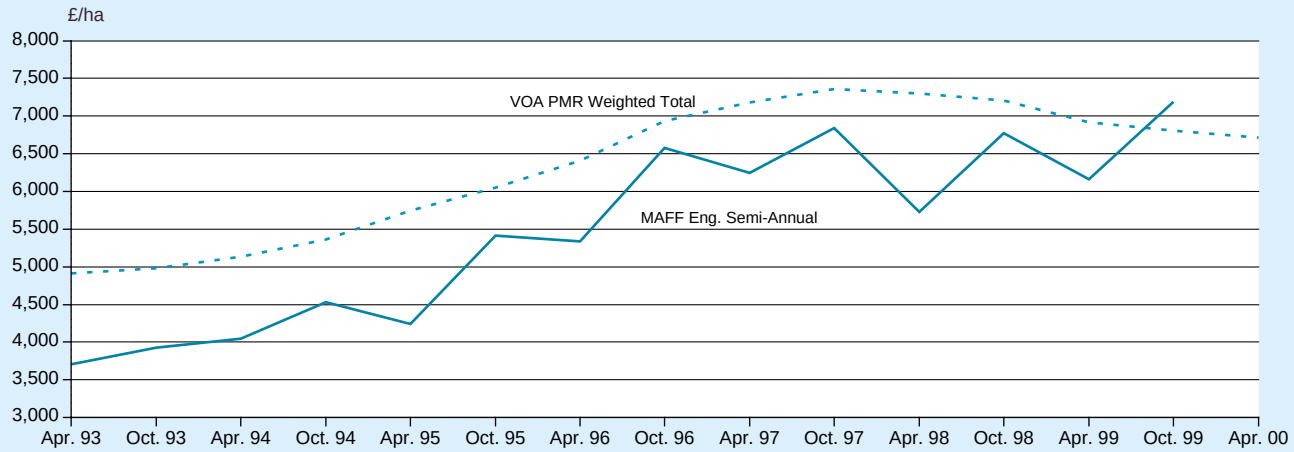
Table 3.1 Semi-annual (derived) MAFF England series and Differences with VOA *PMR* Weighted Prices

Semi-annual period	MAFF All Sales	MAFF Adjusted for vacant Possession	VOA - MAFF (VP)	
				£ per ha.
	ENG. ALP Semi-Ann		Diffs.	Δ % of MAFF (VP)
Apr. 93	3,669	3,705	1,210	*32.64*
Oct. 93	3,888	3,927	1,054	*26.85*
Apr. 94	3,958	4,046	1,086	*26.83*
Oct. 94	4,433	4,532	827	*18.25*
Apr. 95	4,107	4,242	1,500	*35.36*
Oct. 95	5,238	5,410	640	*11.83*
Apr. 96	5,271	5,335	1,073	*20.11*
Oct. 96	6,497	6,576	358	*5.44*
Apr. 97	6,127	6,244	936	*15.00*
Oct. 97	6,716	6,844	519	*7.58*
Apr. 98	5,676	5,724	1,574	*27.51*
Oct. 98	6,721	6,777	433	*6.38*
Apr. 99	6,124	6,162	758	*12.30*
Oct. 99	7,145	7,189	-384	*-5.35*
Mean (93 1 – 99 2)	5,398	5,480	827	*17.20*

Sources : as previous tables

Chart 1

Semi-Annual Land Values: VOA *PMR* Estimates & MAFF (England)



Source: VOA *Property Market Report* (various issues) and MAFF ALP statistics (website)

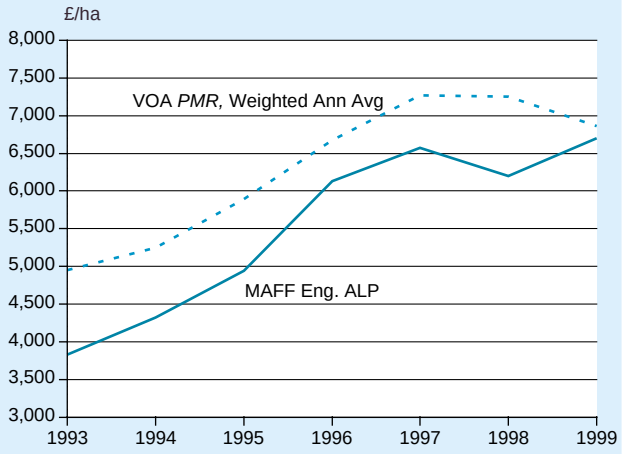
24.6 per cent. The corresponding figure for October 1996 to October 1999 equals 9.8 per cent. Therefore it would appear that there was some tendency towards greater convergence in the more recent period.

Moreover, the correlation coefficient between the VOA *PMR* and the MAFF-based English series is quite high at 0.92. This might suggest that at least some of the components in the respective movements would have reasonable affinity. In order to focus on underlying medium term patterns and avoid focusing on short-term fluctuations, the data are annualised and compared. The annualised VOA *PMR* data are presented with the published MAFF English data in Table 3.2 and graphed in Chart 2.

Whilst it is difficult to draw definite conclusions because of the paucity of observations, longer-term underlying movements, as distinct from levels (especially in the early years), seem to be tracked reasonably satisfactorily. A likely explanation for this is that the underlying values of MAFF's series (in the form of averages) show a decrease in short-term fluctuations and thus show similar characteristics to the generalised estimates of the VOA valuers. Therefore if not exclusively used for short-term fluctuations, the VOA *PMR* estimates may be of potential benefit to indicate underlying trend changes in the market place and indirectly in the MAFF-based data.

Chart 2

Annual Land Values: VOA *PMR* & MAFF



Source: VOA *Property Market Report* (various issues) and MAFF ALP statistics (website)

Table 3.2 Land Prices: Annualised series

	VOA PMR	MAFF All Sales	MAFF Adjusted for vacant Possession	VOA - MAFF (VP)	
					£ per ha.
	Weighted Ann Avg	England		Diffs	Δ %
1993	4,948	3,791	3,829	1,119	*29.24*
1994	5,245	4,229	4,323	922	*21.32*
1995	5,896	4,788	4,945	951	*19.22*
1996	6,671	6,058	6,132	539	*8.79*
1997	7,272	6,449	6,572	700	*10.65*
1998	7,254	6,146	6,198	1,056	*17.05*
1999	6,863	6,662	6,703	160	*2.38*
Mean	6,307	5,446	5,529	778	*15.52*

Sources: as previous table

It is useful to conduct a decomposition analysis[9] in order to consider the basic factors that affect the patterns of the overall series. The VOA *PMR* disaggregate their estimates by a two-way categorisation, involving regions and farm types. However in attempting to analyse these *PMR* estimates disaggregated by farm type, a problem arises because the primary data supplied to MAFF have a different set of

farm type categories. The latter contains a dairy category, whilst the former has a broader marker for livestock (STCK). This marker in MAFF's primary data may well contain both land assigned to dairying and to beef cattle & sheep (B&S) farming.

To overcome this complication, a cross categorisation in MAFF data is suggested whereby the observations with the 'STCK' marker are split between those falling into Land Grade Classes 1, 2 & 3 and those in Classes 4 & 5. It is assumed that the former relate to dairy land and the latter to B&S land.[10] The MAFF-based data are not issued according to such cross-categorisations but unpublished quarterly data based on category breakdown by a proxy farm type was provided from the database.[11] Compiling MAFF-based land prices by farm type on the basis of the foregoing assumptions, a contrasting pattern is displayed by the prices for land categorised as beef & sheep compared to the others.

Whilst this could be due to the assumptions on land class, the divergence is not entirely implausible given the severe difficulties experienced by these livestock enterprises in recent years. Although it may be somewhat difficult to compare directly certain farm-type categories, e.g. the VOA PMR's lowest value category is designated 'Hill land', the clear disparity between this price and those for the other categories (see Appendix 1, Chart A1), replicates the outcome in the MAFF-derived series.

Despite some lack of correspondence in the precise definitions of farm types, they would not be so dissimilar as to prevent meaningful comparison. Differences in the periodicities can be accommodated by suitable adjustments. Whereas the VOA *PMR* are based on semi-annual periods, the MAFF series are normally collated on a quarterly and annual basis and thus have to be converted to semi-annual series. Because quarterly figures for areas sold by farm type were not available, the ratio of the total area sold per quarter to that for the associated half-year was used as a weighting factor to determine average (weighted) prices. The estimations for this are provided in Tables A2.1 and A2.2 in Appendix 2 .

The results for the comparisons between the VOA *PMR* and MAFF data for the separate farm types are presented in Tables 4.1 below and 4.2 overleaf. See also the accompanying graphs (Charts 3–6).

The higher land values at the aggregate level that the VOA *PMR* series almost invariably have relative to the MAFF estimates, are generally repeated at the farm type level. Broadly speaking, movements in the respective data series over time are tracked

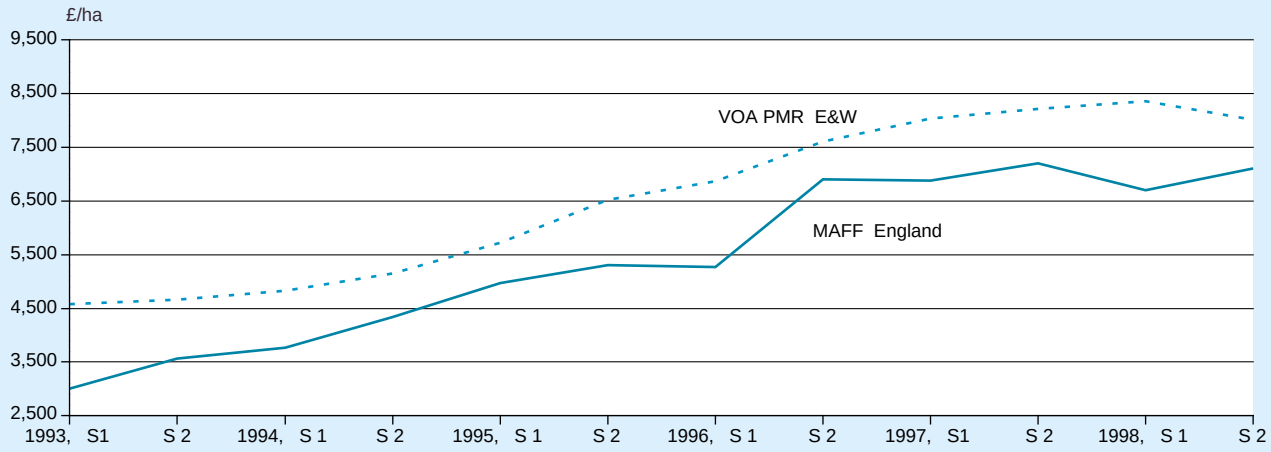
Table 4.1 Land Prices

		Arable Land			£ per ha.	Dairying Land			£ per ha.
		VOA *PMR**	MAFF England	Diffs.	Δ %	VOA	MAFF *PMR**	Diffs. England	Δ %
1993,	S 1	4,580	3,006	1,574	*52.3*	6,506	4,499	1,574	*52.3*
	S 2	4,659	3,563	1,095	*30.7*	6,603	4,654	1,095	*30.7*
1994,	S 1	4,834	3,767	1,067	*28.3*	6,783	4,171	1,067	*28.3*
	S 2	5,155	4,337	818	*18.9*	7,010	4,879	818	*18.9*
1995,	S 1	5,728	4,976	752	*15.1*	7,461	5,291	752	*15.1*
	S 2	6,526	5,311	1,215	*22.9*	7,561	6,156	1,215	*22.9*
1996,	S 1	6,867	5,275	1,592	*30.2*	8,020	6,024	1,592	*30.2*
	S 2	7,605	6,900	705	*10.2*	8,509	7,724	705	*10.2*
1997,	S 1	8,043	6,880	1,163	*16.9*	8,550	7,262	1,163	*16.9*
	S 2	8,221	7,198	1,023	*14.2*	8,705	7,190	1,023	*14.2*
1998,	S 1	8,358	6,703	1,655	*24.7*	8,245	6,705	1,655	*24.7*
	S 2	8,013	7,101	912	*12.8*	8,307	7,371	912	*12.8*
				Mean	***23.1***			**Mean**	***32.2***
				RMS	**1,174**			**RMS**	**1,772**

* England & Wales

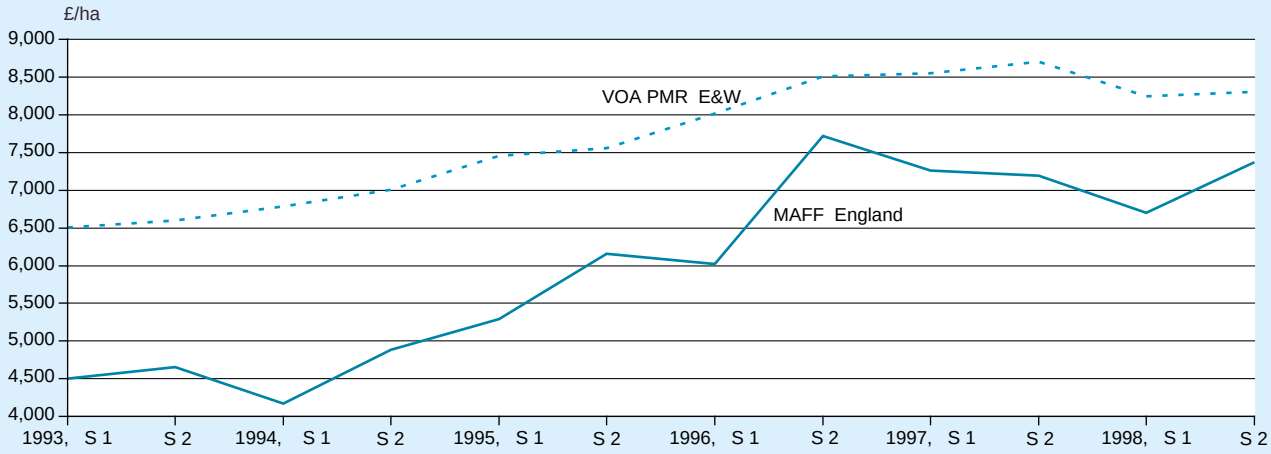
Sources: VOA and MAFF databases

Chart 3
VOA PMR & MAFF Data: Arable Land Prices



Source: VOA *Property Market Report* (various issues) and MAFF ALP database

Chart 4
VOA PMR & MAFF Data: Dairy Land Prices



Source: VOA *Property Market Report* (various issues) and MAFF ALP database

Table 4.2 Land Prices

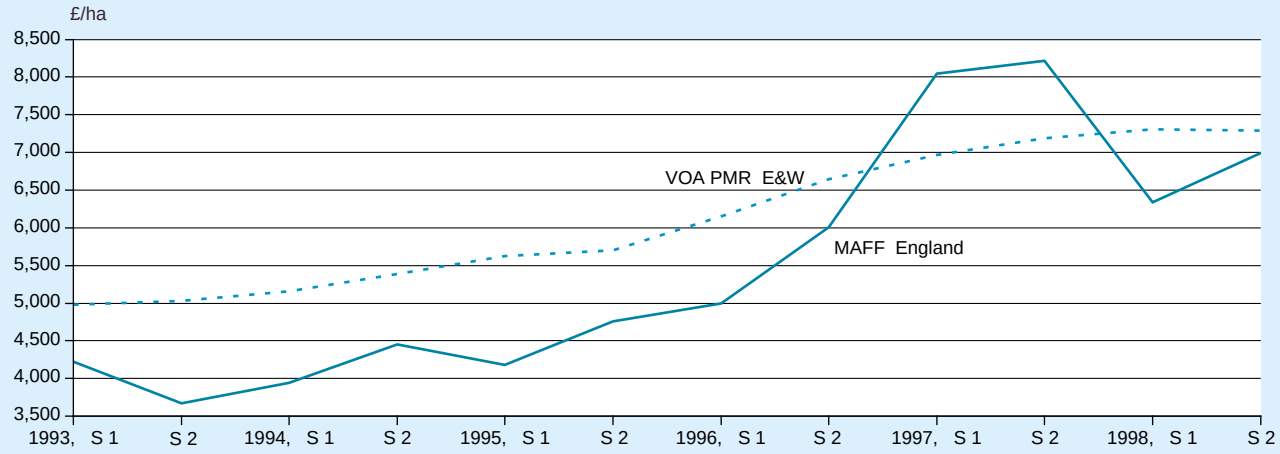
		Mixed Enterprise Land				Hill - Beef /Sheep Land			
					£ per ha.				£ per ha.
		VOA *PMR**	MAFF England	Diffs.	Δ %	VOA *PMR**	MAFF England	Diffs.	Δ %
1993,	S 1	4,982	4,222	760	*18.0*	2,519	3,958	-1,438	*-36.3*
	S 2	5,034	3,671	1,363	*37.1*	2,537	4,256	-1,719	*-40.4*
1994,	S 1	5,155	3,941	1,214	*30.8*	2,660	3,584	-924	*-25.8*
	S 2	5,385	4,453	931	*20.9*	2,655	3,945	-1,289	*-32.7*
1995,	S 1	5,629	4,179	1,450	*34.7*	2,862	2,398	464	*19.4*
	S 2	5,698	4,755	943	*19.8*	3,097	3,067	30	*1.0*
1996,	S 1	6,155	4,992	1,163	*23.3*	3,021	3,173	-152	*-4.8*
	S 2	6,647	6,003	644	*10.7*	3,214	3,217	-3	*-0.1*
1997,	S 1	6,964	8,049	-1,085	*-13.5*	3,190	3,198	-8	*-0.2*
	S 2	7,185	8,218	-1,033	*-12.6*	3,335	3,274	61	*1.9*
1998,	S 1	7,304	6,338	966	*15.2*	3,006	3,200	-194	*-6.1*
	S 2	7,294	6,995	299	*4.3*	3,011	4,105	-1,094	*-26.6*
				Mean	***15.7***			**Mean**	***-12.6***
				RMS	**1,033**			**RMS**	**867**

* England & Wales

Sources : VOA and MAFF databases

Chart 5

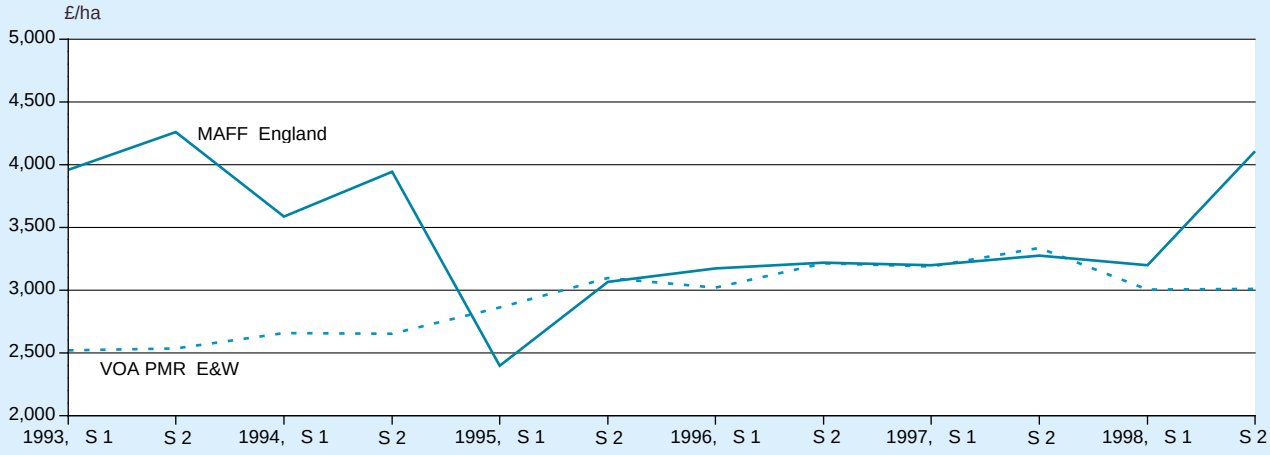
VOA PMR & MAFF Data: Mixed Farm Land Prices



Source: VOA *Property Market Report* (various issues) and MAFF ALP database

Chart 6

VOA PMR & MAFF Data: Beef/Sheep-Hill Land Prices



Source: VOA *Property Market Report* (various issues) and MAFF ALP database

reasonably satisfactorily, apart from some divergent fluctuations in the case of mixed enterprise farm land in 1997–98 and hill-beef/sheep type land in the early years up to 1995. The latter land type achieved both the lowest mean percentage difference and the lowest RMS[g] of the differences between the respective series. Allowing for underlying complications, the VOA *PMR* could potentially provide some useful broad indications of land market movements at this farm type level of disaggregation.

Regional Level

Disaggregation at the regional level is also a matter of interest. To put the data on a comparable basis, adjustments were made to the VOA *PMR* figures similar to those carried out at the national level.[12] The consolidated estimates for the year are compared with official regional estimates in Table 5.

In terms of regional distribution, the largest disparities occur in the North East, Yorkshire & Humberside and East Midlands, all of which have differences greater than 25 per cent. There is a substantial positive difference between the valuers' estimates and the MAFF/NAWAD data in most cases. The main exception is the South East region, which may be because although the MAFF data exclude sales of agricultural land for development, it does include land that may have an element of some development value.

On the other hand the VOA *PMR* estimates relate exclusively to land devoted to various types of farming. It will be interesting in a subsequent study to examine if this regional pattern emerging here is maintained consistently over time, because the regional estimates contribute to the derivation of the national figures and hence may provide an insight into the source of divergences between the respective data series at the aggregate level.

Table 5 VOA PMR & MAFF/WAD Regional Sales Price average for 1998

£ per ha.

Region	VOA PMR Average Total Weighted Price	MAFF/ WAD	VOA *less* MAFF/ WAD	Δ %
North East	6,882	3,801	3,080	*81.0*
North West	7,599	6,161	1,438	*23.3*
Yorkshire & Humberside	7,112	4,578	2,534	*55.3*
East Midlands	7,948	6,143	1,805	*29.4*
West Midlands	7,892	6,481	1,411	*21.8*
Eastern	8,279	6,935	1,344	*19.4*
South East	7,665	8,237	-572	*-6.9*
South West	6,890	6,750	140	*2.1*
England	7,254	6,146	1,108	*18.0*
Wales	5,638	4,669	969	*20.8*

Source: VOA Property Market Report, Agricultural Land Sales and Prices in England and Agricultural Land Prices in Wales, various issues for 1998

Comparing Non-Governmental and MAFF/NAWAD Data

RICS

The RICS data comprise all sales, including auction, private treaty and tender. The returns are processed in association with the Centre for Rural Studies at the Royal Agricultural College, Cirencester. Sales where residential interest exceeds 50 per cent are excluded. Before the data are analysed, a run-list of all transactions is printed, in date order, and by descending order of total price paid. The price per hectare for each transaction is included, together with farm type (e.g. dairy, arable, beef/sheep, residential), whether the property was land, land plus buildings or land plus dwelling/s and buildings, and whether the sale was with vacant possession or sitting tenant. No specific criteria are applied to determine outliers, but an appraisal is made of figures outside a broad band between £4,000/ha and £10,000/ha.[13]

For the first half of 1998, the present RICS survey covered about 15 per cent of the reported number of sales and almost 20 per cent of sales by area traded.[14] For the latest quarter the complete sample is normally not fully available and the estimates are subject to revision. For example for the last two available quarters of 1999 the sample sizes were the following:

	No. of Sales	Area covered (000s ha)
1999 Q2	129 (112)	4.261 (3.598)
1999 Q3	108	6.067

The figures in brackets for the second quarter of 1999 are the initial data reported, which have been subsequently revised up. Revisions occur on a frequent basis. As explained previously, the RICS returns commenced as a continuous quarterly series of vacant possession prices in 1995. The comparative results between the RICS and MAFF data are presented in Table 6 and graphed in Chart 7.

Table 6 Agricultural Land Prices

Vacant possessions Quarterly Data

£ per ha.

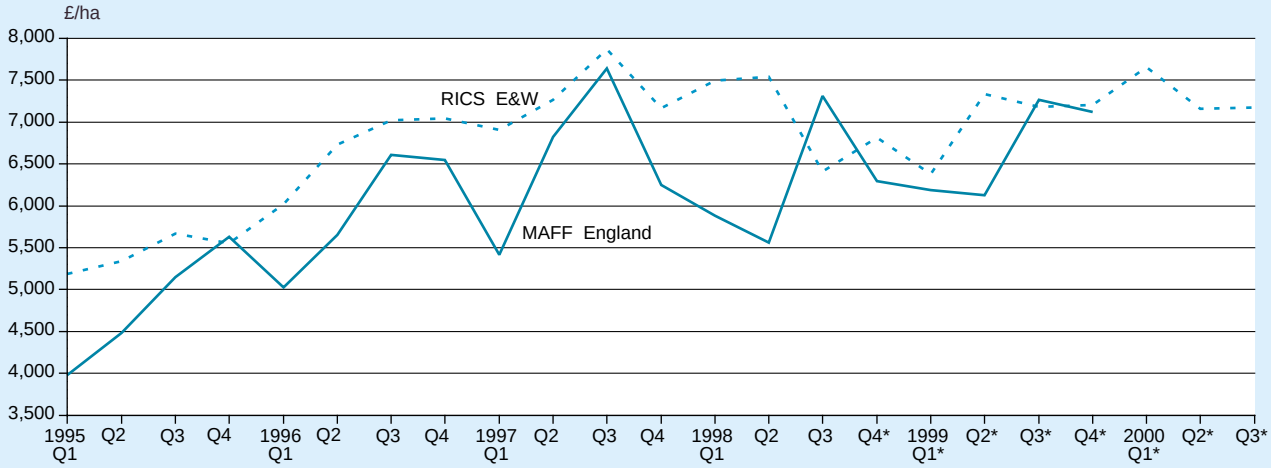
		RICS	MAFF All Sales	MAFF Vacant Possesion		
		England & Wales	England	England	RICS - MAFF VP	
					Diffs.	Δ %
1995	Q1	5,187	3,851	3,978	1,209	*30.4*
	Q2	5,336	4,341	4,484	852	*19.0*
	Q3	5,672	4,986	5,150	522	*10.1*
	Q4	5,556	5,454	5,633	-77	*-1.4*
1996	Q1	6,023	4,963	5,024	999	*19.9*
	Q2	6,731	5,584	5,652	1,079	*19.1*
	Q3	7,019	6,530	6,610	409	*6.2*
	Q4	7,046	6,470	6,549	497	*7.6*
1997	Q1	6,906	5,312	5,413	1,493	*27.6*
	Q2	7,263	6,694	6,822	441	*6.5*
	Q3	7,870	7,496	7,639	231	*3.0*
	Q4	7,166	6,134	6,251	915	*14.6*
1998	Q1	7,494	5,830	5,879	1,615	*27.5*
	Q2	7,545	5,519	5,565	1,980	*35.6*
	Q3	6,411	7,253	7,314	-903	*-12.3*
	Q4*	6,812	6,245	6,297	515	*8.2*
1999	Q1*	6,376	6,151	6,189	187	*3.0*
	Q2*	7,337	6,091	6,129	1,208	*19.7*
	Q3*	7,186	7,223	7,268	-82	*-1.1*
	Q4*	7,225	7,075	7,119	106	*1.5*
2000	Q1*	7,660	n.a.			
	Q2*	7,160	n.a.			
	Q3*	7,174	n.a.			
Mean	'95Q1–'99Q4	6,707	5,960	6,048		*12.2*
Mean	**Absolute**					*13.7*

* Provisional

Sources: RICS Rural Market Research and Agricultural Land Sales and Prices in England, various issues

Chart 7

RICS & MAFF Estimates of Agricultural Land Prices



Source: RICS Rural Market Research (various issues) and MAFF ALP statistics (website)

Given the relatively short time period, it is quite difficult to compare definitively the performances of the two sets of estimates. When comparing the overlapping time spans of the respective time series, the mean difference between the RICS and MAFF series is less than that for corresponding VOA *PMR* data.[15] In particular the MAP[g] difference for this quarterly series at 13.7 per cent appears to compare favourably with that for the semi-annual VOA *PMR* series which equalled 17.9 per cent overall. However, over the more recent period from the first quarter of 1997, whereas the RICS MAPD came down only slightly to 13.4 per cent, that for VOA *PMR* improved to 12.35 per cent. However, these differences would need to be tested more robustly when additional data become available.

In terms of the tracking compatibility of RICS and MAFF, there would appear to be a distinction between the sub-periods before and after 1997. Up to that year, the profiles of the two series (e.g. first and second differences) broadly matched each other (apart from an occasional lag). However, from 1997 either the corresponding signs differed (with the exception of Quarter 1 1999) or the second differences (rates of change) diverged markedly. It is possible that the respective series have asymmetric dynamic properties under generally rising market conditions and situations displaying fluctuations around a hypothetical series which may be at least partly characterised by stationarity[g] features.

The distinction between the pre- and post-1997 Quarter 1 periods can also be seen in terms of the correlation coefficients[g]. For the period overall the coefficient equals 0.72, but if the period from the first quarter of 1997 is taken, the coefficient falls to 0.07. However the RICS may still be a worthwhile indicator of the MAFF data, if it is used cautiously and in association with others. It could be useful, particularly for appraising aspects of short-term market conditions.

Regional Level

RICS provide results of sales at the regional level in the second and fourth quarters and it is a useful background exercise to compare their estimates with the official figures at a disaggregated level. This is attempted for 1998 but some regions do not correspond exactly, e.g. Eastern and East Anglia, and for some regions, RICS occasionally have omissions in data. Nonetheless it is interesting to compare the respective estimates, which are presented in Table 7.

The effects noted previously with the VOA *PMR* estimates in relation to the South East, appear to be repeated here. Apart from Yorkshire & Humberside, the overall range of the differences *vis-à-vis* the MAFF/NAWAD data seems rather less than is the case with the VOA *PMR*. However RICS did not have estimates from the northern region for this year.

Table 7 RICS & MAFF/WAD Regional Sales Price average for 1998: excluding residential farm types

£ per ha.

Region	RICS Weighted Average Price	MAFF/ WAD	RICS - MAFF/ WAD	Δ %
Yorkshire & Humberside	9,098*	4,578	4,520	*98.73*
East Anglia/Eastern	6,307	6,935	-628	*-9.06*
West Midlands	8,252	6,481	1,771	*27.33*
South West	7,162	6,750	412	*6.10*
South East	7,732	8,237	-505	*-6.13*
East Midlands	6,805	6,143	662	*10.78*
Wales	5,458	4,669	789	*16.90*

*Yorkshire & Humberside had no observations in the second quarter and only 6 in the fourth and hence this figure is not reliable.

Sources: RICS Rural Market Research and Agricultural Land Sales and Prices in England, various issues for 1998

Assessment

Whilst it is difficult to draw categorical deductions from the foregoing detailed comparative analysis, some general inferences can be made. It is apparent that inter-relationships between some of the datasets can be made operationally functional and the potential indicator roles that certain data might perform can be clarified. However, while indicating this, the results also show that because the various series are compiled on different foundations and for contrasting purposes, one should exercise considerable caution when attempting to link them together.

The most desirable roles that industry analysts and policy-makers want the specialist surveys or time series to perform are to provide approximate indications of current or impending changes in land prices, with reasonable reliability. The results obtained so far would suggest that this problem could be approached at two levels.

The first is at the basic level of determining the underlying core trends in farm land prices. It would appear that the VOA *PMR* estimates could play a useful role in fulfilling this function. They aim to indicate broad but up-to-date trends in the value of typical property types. As such they give less weight to certain factors that would generate short-term variability, such as transitory and unusual disturbances, or the composition of transactions, although other extraneous factors obviously remain.

It was seen from the annualised series for VOA *PMR* and the MAFF data that these tracked each other quite well. Moreover at the sub-annual periodicity, the average differences between them narrowed over time. Therefore the VOA *PMR* data may be taken as reflecting the core values in the land market and could be used to give an indication of prospective movements in underlying changes over a medium term time horizon, i.e. 8–9 months, in the MAFF series.

It was observed that the VOA *PMR* estimates had almost universally and systematically higher values than MAFF's. Therefore in order to use the former to project the latter forward in time, it will have to be adjusted downwards. For the semi-annual data the difference for the period from 1997 equalled 10.5 per cent and hence a reasonable adjustment factor would appear to be 10 per cent. The VOA *PMR* figure, adjusted downwards, could be taken as an approximate predictor of prospective underlying core MAFF land values that will not be published until later. Given the scheduling of releases, this would usually provide up to a nine months lead indicator of the upcoming MAFF estimates.

Having established a preliminary estimate of the underlying core movement in land prices, there is need to recognise short-term fluctuations around the core values. It was seen that MAFF's quarterly series is characterised by considerable volatility.[16] A means of incorporating this variability property into the construction of a lead indicator would help to make the projections more realistic.

In order to allow for such short-term changes, the most suitable data with short periodicity would be the quarterly estimates provided by RICS. In the sub-period for which data are available for both this series and MAFF's, i.e. 1995 Q1 to 1999 Q4, the scale of the deviations are not very dissimilar. For RICS the standard deviation and the standard deviation to mean ratio are 780.75 and 0.116 respectively, while for MAFF VP they are 963.7 and 0.159 (respectively). Therefore by identifying the volatility vectors in the RICS series, one could map this characteristic onto the constructed series.

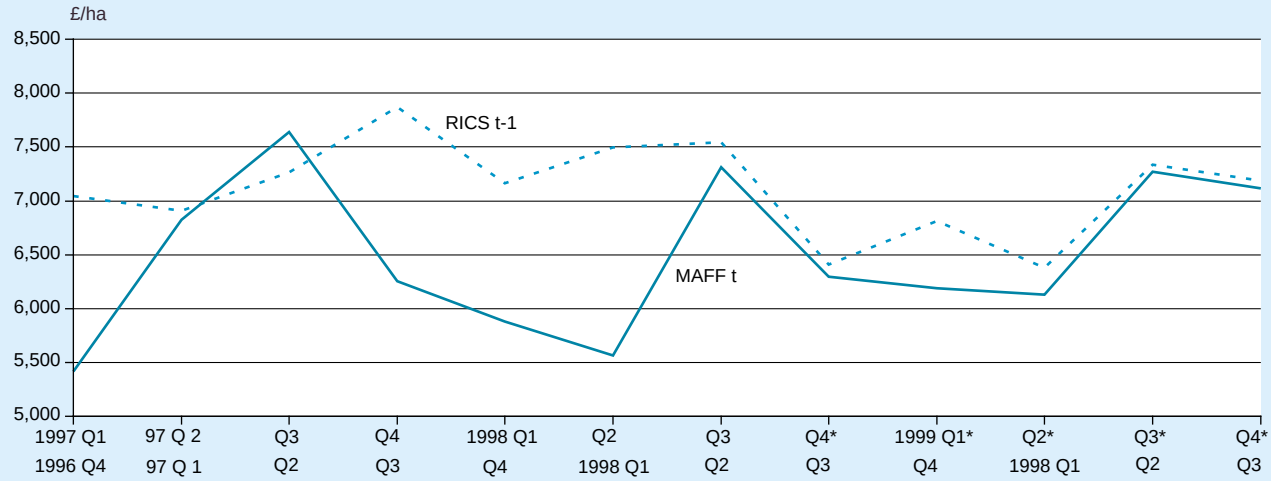
A complication with this procedure arises from the phenomenon noted earlier that there appears to be a disjuncture in the tracking relationship between the RICS series and MAFF's around 1997. If one examines Chart 7 with respect to tracking performance, one can distinguish the period up to 1997 when the first and second differences characterising the turning-points were largely matched (with a few minor exceptions[17]). However in 1997 the two series appear to have been dislocated. There are insufficient observations to conduct detailed statistical tests to establish the optimal relationship between RICS and MAFF data in the subsequent sub-period. However a scrutiny of the series (see Chart 8) would indicate that taking a first order lag on the RICS data would improve the performance in terms of tracking the majority of turning-points. The divergent path at the beginning of the period (i.e. Q1 to Q2 1997) is not altogether surprising and scarcely relevant for future projections, as this would have been a transition period in the adjustment from the earlier configuration to the later one. Although RICS data, lagged 1 quarter, do not match the scale of the fluctuations in MAFF's series, after the initial reference period they broadly correspond in the majority of cases with respect to the direction of change.

Examining the data suggests that there was an alteration in the general direction of long-run movements in land prices during the course of 1997 and into 1998. Whereas from 1993 up to this period the long-run trend in agricultural land prices tended upwards, from around this time a medium/long-run levelling or downturn was experienced (albeit with appreciable fluctuations). This underlying alteration in the market conditions would affect perceptions and expectations of price movements.

Whilst in the years from 1993/94 to 1997/98 a projection of trends that had been experienced in the recent past would have been a reasonable mechanism for determining expectation formation, the

Chart **8**

MAFF (Current) & RICS (1st order) lag prices



novel conditions under the changed market circumstances would have required more elaborate assessments with greater demands on specialist information and processing. There certainly appears to be a perception in the market-place that conditions were becoming more changeable and unpredictable.[18]

In such unfamiliar circumstances, a body or organisation with market research facilities and a capability to process information that is received on an on–going basis would have an advantage in forming knowledgeable predictions of forthcoming market developments. Having expanded their information base, the surveyors' institution, RICS, is in a position to try to perform this function for their clients. In conditions largely characterised by market continuity the outcomes of expert predictions would be unlikely to be substantially different from 'naïve' commonly available projections in any period. However when greater uncertainty prevails, one would anticipate more sizeable dissimilarities, particularly with respect to timing.

This market situation would also be characterised by an asymmetric distribution of information between those market participants who acquired expert advice and the majority with imperfect information. Therefore the subset of sales being reported by chartered surveyors would not be typical of general out-turns at that specific point in time, but they would be likely to anticipate prospective developments in the wider market. Thus under conditions prevailing since around 1997 the first order (quarterly) lag on the RICS price would correspond approximately with the current quarter value of the MAFF price.

Attempting to establish a correspondence between $MAFF_t$ and $RICS_{t-1}$ could generate problems if the primary, MAFF, quarterly data were characterised by seasonality. The Central Association of Agricultural Valuers (CAAV) indicated that they were not aware of any significant seasonal dimension to agricultural land prices nor had they perceived such seasonality.[19] In order to test this with respect to quarterly seasonality, a simple econometric model was tested. The results are presented in Appendix 3 and confirm the observation of the CAAV over the long-term period.

Whilst larger models with more exogenous variables could be estimated, this requires more observations and is unlikely to materially affect the overall underlying results on quarterly seasonality given the very low significance levels attained. Although occasional temporary seasonal phenomena cannot be tested here because of degrees of freedom constraints, such effects are unlikely to be systemic or long-term.[20] Therefore, establishing a correspondence between a lagged and a current quarter land price estimate would not generate significant seasonality complications.

Looking overall at the foregoing components that could be used to construct a leading indicator for agricultural land prices to foreshadow current (and immediately preceding) quarter values of the MAFF series, there are a number of precise ways in which these could be combined to construct a composite gauge. To obtain an estimate of the intermediate-term tendencies in underlying 'core' movements, the VOA *PMR* semi-annual estimates could be taken and adjusted by their observed ratio to the equivalent MAFF data. Thereafter to allow for short-term fluctuations, recourse could be had to the RICS quarterly data.

Short-run variability could be measured by subtracting each of the observed RICS quarterly values over the projection period from the successive four quarter mean (up to and including that quarter). The proportionate variation so calculated could be applied to the

derived underlying core value to determine the 'shadow' or leading indicator of the MAFF series. As explained above, the first order lag on the rate of change in the RICS series would be the relevant predictor for the current rate of change in the shadow indicator series. The outturn from this method would provide a composite lead indicator of up to nine months for MAFF's land prices data.[21]

Conclusion

The importance attached to measuring dynamic conditions in the agricultural land market by a broad range of interested parties demonstrates the significance of prices as a barometer not only of current but also of expectations of future states of the agricultural sector. There is a wide-ranging interest in obtaining estimates of market prices as up-to-date as is practicable. This forms the background to the present article in which various time series for land prices have been examined and compared. It is recognised that each of those available is constructed for a different purpose to the others and accordingly each has different advantages and disadvantages. Although direct or simple comparisons cannot be made, if they are carefully analysed some may serve potentially interrelated functions. The main strength of the 'official' MAFF series is its comprehensiveness, while its chief limitation lies in the time needed to process the primary legal returns.

In general there is no simple means of satisfying these two requirements. The procedure outlined in this article would hardly attain optimal outcomes in a mathematical or strictly scientifically proven sense. However this does not preclude the advantage of establishing a paradigm that draws on a number of different sources to derive up-to-date, even if provisional and approximate, estimates of agricultural land prices. There is an ongoing need on the part of analysts and policy-makers to obtain early predictive indications of prospective conditions in the agricultural sector.

It is hoped that the system proposed will provide at least a heuristic methodology that will address that need and assist in timely land market analysis. It aims to establish the building blocks for the construction of a leading indicator for land prices series, which could play a very useful role in making balanced short-term projections for agriculture. It might also act as a starting point for the development of robust forecasting models of agricultural land prices.

Appendix 1

Table A1 VOA Property Market Report *(PMR)*

Value of Agricultural Land with Vacant Possession
England & Wales

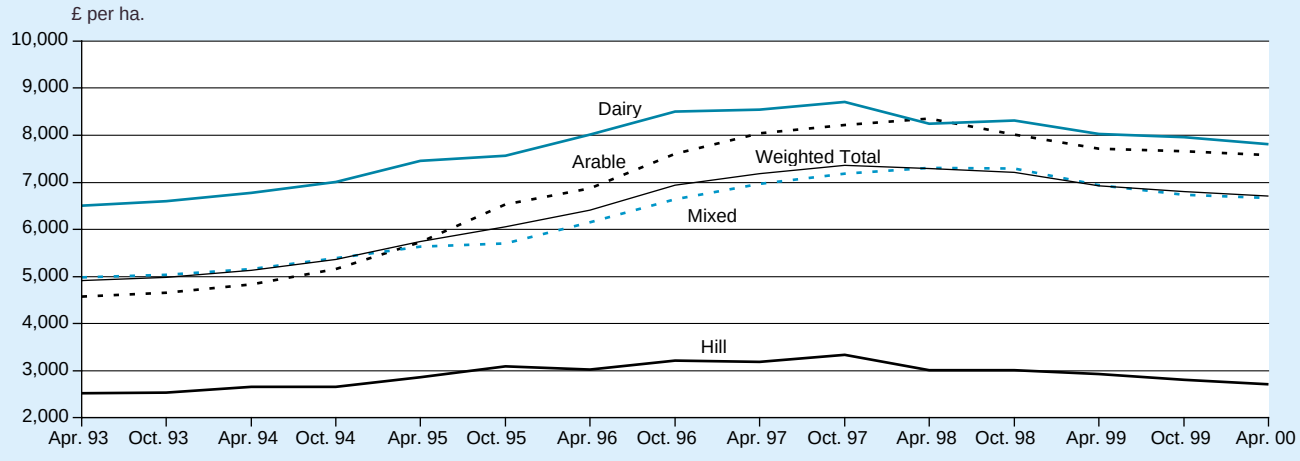
£ per ha.

	Type of Farmland				
	Arable	Dairy	Mixed	Hill	Weighted Total
Apr. 93	4,580	6,506	4,982	2,519	4,915
Oct. 93	4,659	6,603	5,034	2,537	4,981
Apr. 94	4,834	6,783	5,155	2,660	5,132
Oct. 94	5,155	7,010	5,385	2,655	5,359
Apr. 95	5,728	7,461	5,629	2,862	5,742
Oct. 95	6,526	7,561	5,698	3,097	6,050
Apr. 96	6,867	8,020	6,155	3,021	6,408
Oct. 96	7,605	8,509	6,647	3,214	6,934
Apr. 97	8,043	8,550	6,964	3,190	7,180
Oct. 97	8,221	8,705	7,185	3,335	7,363
Apr. 98	8,358	8,245	7,304	3,006	7,298
Oct. 98	8,013	8,307	7,294	3,011	7,210
Apr. 99	7,709	8,030	6,936	2,932	6,920
Oct. 99	7,659	7,958	6,741	2,808	6,805

These are graphed in Figure A1

Sources : VOA database

Chart **A1**
Agricultural Land Values, England & Wales: VOA *PMR*



Appendix 2

Table A2.1 MAFF Quarterly figures: average prices

		Land Use (by Farm) Type					£ per ha.
Year		Arable	Dairy	Beef & Sheep	Mixed Enterprise	Total Area sold (ha.)	Proportions of Semi-annual Sales
1993	Q 1	2,887	4,140	3,528	4,265	17,862	0.513
	Q 2	3,131	4,876	4,410	4,177	16,985	0.487
	Q 3	3,739	4,859	4,090	3,325	19,369	0.443
	Q 4	3,424	4,491	4,387	3,945	24,391	0.557
1994	Q 1	3,512	4,304	3,153	3,853	18,948	0.510
	Q 2	4,032	4,279	2,368	4,116	18,213	0.490
	Q 3	4,129	5,307	3,276	4,382	22,728	0.460
	Q 4	4,514	4,350	3,973	4,870	26,687	0.540
1995	Q 1	4,895	5,126	1,705	3,054	17,370	0.478
	Q 2	5,050	5,443	3,032	5,210	18,961	0.522
	Q 3	5,017	5,890	3,948	5,462	25,341	0.460
	Q 4	5,561	6,383	2,316	4,152	29,699	0.540
1996	Q 1	4,863	5,768	2,551	4,741	19,056	0.503
	Q 2	5,692	6,283	3,802	5,247	18,827	0.497
	Q 3	6,982	7,898	1,699	6,150	30,234	0.446
	Q 4	6,834	7,584	4,436	5,885	37,625	0.554
1997	Q 1	6,664	8,459	1,313	7,374	23,042	0.414
	Q 2	7,032	6,415	4,531	8,526	32,566	0.586
	Q 3	7,246	7,900	3,639	9,103	27,791	0.424
	Q 4	7,163	6,668	3,005	7,567	37,806	0.576
1998	Q 1	6,116	6,878	3,095	6,094	25,656	0.497
	Q 2	7,283	6,534	3,303	6,579	25,989	0.503
	Q 3	7,248	8,129	5,947	7,203	18,594	0.493
	Q 4	6,959	6,634	2,314	6,792	19,130	0.507
1999	Q 1	6,138	5,773	4,583	6,816	12,220	

Sources: as previous

Table A2.2 MAFF-Based Semi-annual figures: average (Weighted) Prices (weighted by area sold)

				£ per ha.
	Land by Farm Type			
Year, Semi-annual	Arable	Dairy	Beef & Sheep	Mixed Enterprise
1993, S1	3,006	4,499	3,958	4,222
S2	3,563	4,654	4,256	3,671
1994, S1	3,767	4,171	3,584	3,941
S2	4,337	4,879	3,945	4,453
1995, S1	4,976	5,291	2,398	4,179
S2	5,311	6,156	3,067	4,755
1996, S1	5,275	6,024	3,173	4,992
S2	6,900	7,724	3,217	6,003
1997, S1	6,880	7,262	3,198	8,049
S2	7,198	7,190	3,274	8,218
1998, S1	6,703	6,705	3,200	6,338
S2	7,101	7,371	4,105	6,995

Sources: as previous

Appendix 3

The regression model is specified as follows :

$LP_M = b + a_1 S_1 + a_2 S_2 + a_3 S_3 + u$

where

LP_M = MAFF agricultural land prices (all sales)
b = intercept
S_1 = Quarter 1 dummy
S_2 = Quarter 2 dummy
S_3 = Quarter 3 dummy

The results are :

Ordinary Least Squares Estimation

26 observations used for estimation from 1993 Q1 to 1999 Q2

Dependent variable : LP_M

Regressor	Coefficient	Standard Error	T-Ratio
b	5515.0	490.06	11.25
S_1	- 715.42	667.84	-1.07
S_2	- 408.43	667.84	- .61
S_3	197.33	693.05	.28

R^2: 0.0934 R-Bar^2 : -0.0302
S.E. of Regression 1200.4 F-stat. $F_{(3,22)}$ 0.756
Mean of Dependent Variable 5258.0 S.D. of Dependent Variable 1182.7
Residual Sum of Squares 3.17E+07

The low values of the t-ratios indicate that the null hypotheses regarding quarterly seasonality of land prices cannot be rejected over this time period.

Footnotes

1 Strictly speaking it is the Statistical Directorate of Wales that collect these data rather than the NAWAD itself.

2 This which is published as an annual series is one of the longest land price time series with its origins going back to 1945 when it was known as the Oxford Institute series. The series was taken over by Savills' research department in 1989.

3 Walsh, *Valuation of Agricultural Land*, Conference Paper, 1997, p.3. It is recognised, of course, that the land price is not necessarily a definitive or infallible indicator. Numerous exogenous factors can influence land prices and agricultural profitability independently. One of the clearest examples of this is the demand from non-farmers for residential properties with some land attached, which can affect prices particularly within a reasonable vicinity of conurbations and motorways leading from them. The importance of this locational factor was pointed out to me in a private communication from Mr. Jeremy Moody of the Central Association of Agricultural Valuers, 9.4.2001. For the significance to land values of proximity to metropolitan areas see also Harvey & Willis, (1997), pp. 57, 66–67.

4 The data in this series are supplied to MAFF directly by the VOA. The primary data source is the VOA's 'Particulars Delivered' forms for property transactions. These contain the details of all sales of agricultural land that are required to be notified to the Inland Revenue under Authority of the Finance Act 1931, as amended by the Land Commission Act 1967 and section 89 of the Finance Act 1985. The transactions are analysed by MAFF who produce the tables for publication. The sales are analysed according to the date of the sale. Because of the variability in the length of time it takes to notify sales to the VOA and to process the data, it is unavoidably the case that a proportion of transactions will not have been entered and processed in the system at the time of initial publication.

5 Current Agricultural Land Prices series was compiled jointly by Agricultural Development & Advisory Service, Agricultural Mortgage Corporation and Country Landowners Association (ADAS/AMC/CLA).

6 On average Welsh agricultural land prices (all sales) represent approximately 77 per cent (76.8 per cent for the period 1993 to 1999) of corresponding English prices. An exception to this pattern occurred in the Qr 2 of 1999 when the Welsh estimates were affected by a small number of transactions, which were untypical.

7 There are 8 locations in Wales compared to 130 in England, representing 6.15 per cent. The area of agricultural land sold in Wales amounted to 13.04 per cent of corresponding areas in England in 1999 and the total tillage & grass (excluding rough grazing) areas in Wales represented 15.2 per cent of that in England (June 1999 Census).

8 The difference between the VOA *PMR* and the MAFF English (semi-annual) series are almost uniformly positive (with one exception) and relatively large. The null hypothesis, that the mean = 0 , can be rejected at the 5 per cent confidence level. In addition the dynamic profiles of the series show contrasting features, e.g. for the range of 14 observations available, on as many as five occasions turning-points in the official series were not tracked and between two other time periods (Oct.'95-Apr 96 and Oct.'97-Apr. 98) although the signs of the first differences were similar, the rate of acceleration or deceleration were substantially different.

9 This involves disaggregating the datasets and analysing the relevant isolated components.

10 One recognises that this would be only an approximation because Class 3 could occasionally be devoted to either type, depending on region.

11 This proxy breakdown analysis for the most recent provisional data for 1999 was not available at the time of writing.

[12] Thus the values by farm type were weighted by the number of observational examples as previously, to obtain the weighted average semi-annual estimates. These were in turn averaged to derive a set of regional values for 1998 to correspond to the MAFF regional figures for that year, which are taken here because although still deemed provisional they will be subject to less revision than those for 1999.

[13] For data producing a price below this range a check is made (by going back to the original sale return received) for a reason, e.g. sitting tenant, low grade land (4), upland type farm, etc. For a figure above this range a check is made for an explanation, such as small area of land where premium is paid, high grade land (1 or 2), and also whether the residential property element (or even development value) has been appropriately considered. If a satisfactory explanation can be found the data remain. If it needs to be reclassified (e.g. as a residential sale or 'other') then this is done. If the data simply seem erroneous, it is deleted.

[14] The RICS data recorded 246 sales covering an area of 10,700 ha (private communication from RICS, 14.3.2001).

[15] Regarding hypothesis testing, as in the earlier VOA *PMR* case, for RICS also the null hypothesis (that the mean = 0) can be rejected at the 5 per cent confidence level.

[16] For the population of all sales from 1993 1 to 1999 4 the standard deviation was 1215.82, which had a ratio to the mean of 0.225.

[17] Q4 1995, Q1 & Q4 1996.

[18] FPDSavills *Market Survey*, Autumn/Winter 2000, p.2.

[19] Private communication from Mr. Jeremy Moody of the Central Association of Agricultural Valuers, 28.5.1999.

[20] Even if seasonality features were to emerge, this would not be critical to the indicator function because adjustments to the data could be made to allow for this.

[21] For the alternate quarters that VOA *PMR* does not appear, an interim one quarter projection of the core value could be derived using the mean of the RICS data. The Royal Agricultural College has indicated that provisional, unadjusted RICS data are produced immediately at the end of every quarter (private communication from RICS, 14.3.2001). Utilising these data could speed up the issuing of the indicator estimates.

Glossary

(brief, generalised, description of some technical terms)

ADAS/AMC/CLA: Agricultural Development & Advisory Service, Agricultural Mortgage Corporation and Country Landowners Association; co-sponsors of CALP (Current Agricultural Land Prices), now superseded.

Correlation coefficient, ρ_{xy}: It can be regarded as a measure of the relation between the statistical distributions of two random variables with the variances σ^2_x and σ^2_y respectively.

The correlation coefficient is defined as follows :

$$\rho_{xy} = \frac{\mathbf{Cov\ (X, Y)}}{\sigma_x, \sigma_y}$$

where: $-1 \leq \rho_{xy} \leq 1$ and:

$$\mathbf{Cov\ (X, Y)} = {}^1\!/_n \sum_{i=1}^{n} (x_i - \mu_x)(y_i - \mu_y)$$

MAPD: Mean absolute percentage difference.

RMS: The root mean square: $\sqrt{\frac{\sum x^2}{n}}$

Standard deviation: It is a measure of how widely values are dispersed from the average value (the mean).

$$\sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$$

Stationarity: A time series is stationary when it does not contain a trend and/or exhibit cycles with increasing or decreasing amplitude over time.

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