

Coping with the Credit Crunch? A Financial Appraisal of UK Farming

Dr Jeremy Franks

Centre for Rural Economy Discussion Paper Series No. 25

December 2009

Summary

As the UK enters the third year of the credit crunch and passes through a fourth quarter of negative economic growth, it is an appropriate time to identify risks arising from the financial structure of UK agriculture. The starting point is the work of Harrison and Tranter (1989). They identified seven sources of growing risk from the changing financial structure of UK agriculture leading up to 1986. These sources of risk are updated to identify those that remain. Additional emerging sources of risk are then identified using Hudson's (1986) causes of bankruptcy (negative equity, inadequate cash flow and uncertain future profitability), and the threats related to credit rationing. UK farming appears well placed compared to the late 1980s. It has benefited from its traditional conservative attitude to credit. But it remains exposed to (i) exposure of profitability to global markets and cash flow risk and downward readjustment in asset prices, (ii) a higher dependency on government subsidies and the increasing transparency of these subsidies, (iii) a higher exposure to exchange rate risk, (iv) counterparty risk, (v) increased protectionism, (iv) exposure of diversified income streams and off-farm employment to the economic recession, and (vii) fiscal policy as the UK and other governments around the globe seek to rebalance their deficits by revising taxation and spending plans. The impacts of these exposures will only become known after the full effects of all stimulus packages and support from governments around the world have worked their way through the global economy. As the UK government seeks to balance its fiscal position, there is a danger that the relative financial stability of agriculture may make it a target for a combination of tax increases and spending cuts. If so, this would reduce the profitability of farming, which would have knock-on effects including reduced farmland asset values, and an increased difficulty in servicing interest repayment.

Introduction

Risk - the estimated measure or probability of some event happening - and uncertainty - knowing nothing about the likelihood of possible outcomes - occur because nothing about the future is certain (Pannel *et al.*, 2000, p. 69). Both are expected when working with natural, unpredictable, biological systems, and this makes farming a high risk and uncertain business (Willcok *et al.*, 1999; Nguyen *et al.*, 2005). Yet despite high risk and uncertainty, farm managers need to take decisions; so coping whilst basing actions on insufficient information is commonplace. An appreciation of this is critical to understanding farm-management decisions because each decision is part of a sequence that creates the future, and it is the accumulated effect of repeated choices which may have the most significant impact on overall business performance (Hardaker *et al.*, 2004). Agricultural business managers therefore need to identify current sources of risk, how these sources have changed over time (to identify which are increasing and which decreasing in importance), and to evaluate how these changes might affect their coping strategies.

Several studies of the financial structure of UK farming were published in the late 1980s and early 1990s reflecting the downturn in the sector's fortunes at that time (Johnson 1986; Harrison and Tranter, 1989; Johnson, 1990; Harrison and Tranter, 1994; Harrison and Tranter, 1995). It is appropriate to return to this area as the UK enters the third year of the credit crunch¹ and with UK GDP having contracted by 0.1%, 0.6% and 1.8% in the second, third and fourth quarters of 2008 respectively, and by 2.4%, 0.6% and 0.4% in the first three quarter of 2009,² and with the European Commission forecasts of a further decline of 3.8% in 2009. As "the UK economy is now clearly experiencing one of its worst recession in recent history" (Fildes, 2009), and with most of the slowdown in economic activity occurring in the last quarter of 2008 and first quarter of 2009, the bulk of the setback in production will be reflected in the statistics for 2009 (UNCTAD, 2009, p. 4), in which year UNCTAD predicts a 2.7% fall in global GDP.

The collapse of credit supply and financial asset prices in September 2008 exacerbated the economic slump. Commercial banks had to be recapitalised, not only because they were suffering losses from non-performing loans, but also because the remaining assets suddenly became more risky, requiring higher capital coverage. Banks sought to strengthen their balance sheets by selling toxic assets to government supported programmes or writing them off, by reducing lending and foreclosing on short-term, unsecured loans and recapitalising from current profits, in part by failing to pass on low central bank interest rates and in part by increasing the fees charged to customers. This cutback in the provision of credit immediately translated credit risk into liquidity

¹ The credit crunch is considered by many to have begun on 9th of August 2007 - the day the European Central Bank and the US Federal Reserve injected \$90 billion (£45 billion) into financial markets (Elliott, 2008).

² The widely accepted definition of a recession is two consecutive quarters of negative growth in GDP.

risk: many of those businesses which relied on short-term credit were forced to consider selling part of their assets in order to meet their short-term liabilities. As a consequence, the reduced credit supply exerted additional downward pressure on some asset prices, causing a further deterioration in the solvency of borrowers and additional loan foreclosures.

The unprecedented stimulus packages, monetary policy easing and support for ailing financial institutions introduced by governments across the globe appear to have stabilised financial markets, but have been insufficient to revive demand and halt rising unemployment (Marshall 2009). Such support measures increased the UK Government's net debt by over £100 billion in 2008-09 to £800.8 billion, equivalent to 56.8% of gross domestic product (ONS, 2009).³ It is currently projecting a 1.1% a year real growth in public spending (IFS, 2009) with annual net borrowing projected to peak at £118 billion in 2009-10. The public sector net debt is forecast to keep increasing as a share of national income until 2015-16 whilst budget deficit is halved in the four years from 2010/11 (HM Treasury, 2009). One implication of this is that a business can plan for a combination of tax increases and spending cuts, another is that public sector net debt interest payments will grow as a percentage of national income to 2.4%. Subtracting this from the 1.1% real growth in total expenditure leaves only a 0.7% average annual real growth for all other areas of spending (IFS 2009: p 180). To an extent some of government's other expenditure commitments, for example benefit expenditure, can also be calculated and deducted from the 1.1% real overall growth. When this is done, departmental expenditure would have to remain frozen in real terms between 2010-11 and 2013-14 (IFS, 2009, p. 182).

"These implied spending plans are so tight that all major spending departments are likely to be affected" (IFS 2009 p 182). Under the existing Spending Review, the Department of Environment, Food and Rural Development (DEFRA) received a real cut in spending of about 1.8%. If there is no real growth in total department expenditures and assuming the pain is shared equally, it is estimated that DEFRA would experience a 4% real cut in its departmental expenditure limit (IFS 2009: p 182-183). These forecasts of revenue and expenditure are based on the UK economy growing by 1.25% in 2010 (HM Treasury, 2009, p. 18), which itself is based on "the assumption that G20 authorities deliver on policy commitments and that financial conditions ease as a result" (p. 181); though not all commentators believe the policy responses put in place will be successful. For example, Stiglitz (2009), the 2001 Nobel prize winner in economics, believes that "our collective response has been mistaken and inadequate – that we may just have made matters worse", and the IMF (2008) World Economic Outlook report argues that episodes of financial turmoil characterized by banking sector distress are more likely to be associated with severe and

³ These data include the costs of interventions in the financial sector. It is likely that some proportion of these costs will be recovered if the government sells its stake. If these costs are excluded, net debt is £658.1 billion, 46.6% of GDP.

protracted downturns than episodes of stress centred mainly in securities or foreign exchange markets (IMF, 2008, p. 129)

These financial developments and uncertainties in the global and UK economies make this an appropriate time to once again consider the resilience of UK agriculture from the perspective of its financial structure. The paper is structured as follows. As any impacts will vary with the conditions in place at the start of the financial crisis, which includes the state of the sector's balance sheets and the dynamics of the credit and asset prices in the run-up to that crisis, the starting point is an evaluation of Harrison and Tranter's 'seven sources of growing risk in UK agriculture', which are listed and classified by risk category. In section three the data from which these sources of risk have been identified are updated, in as far as it is possible to do so, to assess any threats they pose to UK farming today. Section four identifies emerging sources of risk by comparing UK agriculture's financial structure and future prospects with Hudson's (1986) principle causes of bankruptcy; negative equity, inadequate cash flow and uncertain future profitability. Section five discusses the potential impacts on UK agriculture of the global and national macro-economic circumstances. A conclusion completes the paper.

Harrison and Tranter's (1989) Seven Source of Growing Risk

This paper takes as its starting point the authoritative study of the impact of the changing financial structure of UK farming on emerging sources of risk by Harrison and Tranter (1989). Drawing on a wide range of financial trends up to 1986, they concluded "risk in farming has increased, in recent years, in at least seven distinct and important ways" (p. 61), namely:

- Interest rate increases, an increase in overall debt in total, especially to variable interest rate sources, and because interest rates are now much higher in real terms (that is after allowing for changes in the retail price index (RPI));
- Withdrawal of Financial Institutions from the land market as purchasers, reducing farmers' opportunities to sell land and lease it back in order to rid themselves of excessively heavy debt service burdens;
- Based on large scale survey work, in the early 1970s, a diminishing of within-the-family funding sources as members of the farming family who had been left farm assets demanded their shares be paid in cash, increasing the splitting-up of farms on the death of the owner;
- The increased dependency of the industry on purchased inputs from the rest of the economy and therefore subject to additional price risks on that account and because farmers are increasingly unable to substitute low-cost family labour inputs for them;
- Continuing deterioration in the sector's terms of trade, with inputs costing more and products commanding lower prices;

- Increased variability of farm product prices compared to what they were 8 to 10 years previously; and
- Based on farm survey data, the increased year-to-year variation in farm income between 1981-85 compared with the period between 1976 and 1980.

These emerging risks can be classified into the following categories of risk identified in the literature (Miller *et al.*, 2004); financial risk (interest rate changes and levels of debt, and changing sources of finance); institutional risk (changes to the land market); societal risk (changes in family aims, goals and norms); business risk, comprising market price risk (increased dependency on inputs, deterioration of sector's terms of trade, and increased variability of farm product prices and farm incomes) and production risk (reduction of low-cost family labour and increased variability of farm incomes); and macro-economic policy (such as interest rates, inflation, etc.). There are, therefore, some types of risk that they did not consider particularly altered from their long-term trend, such as those posed by animal diseases, uncertain availability of inputs, counterparty risk (the risk that trading partners might declare for bankruptcy), technological risk due to technological obsolescence, agriculture sector specific risks, exchange rate risk and environmental risks. The following section updates these seven sources of risk in so far as it is possible to do so, given the change in the way data is collected, collated and reported, and the absence of farm survey data. This is followed by an analysis of emerging sources of growing risk.

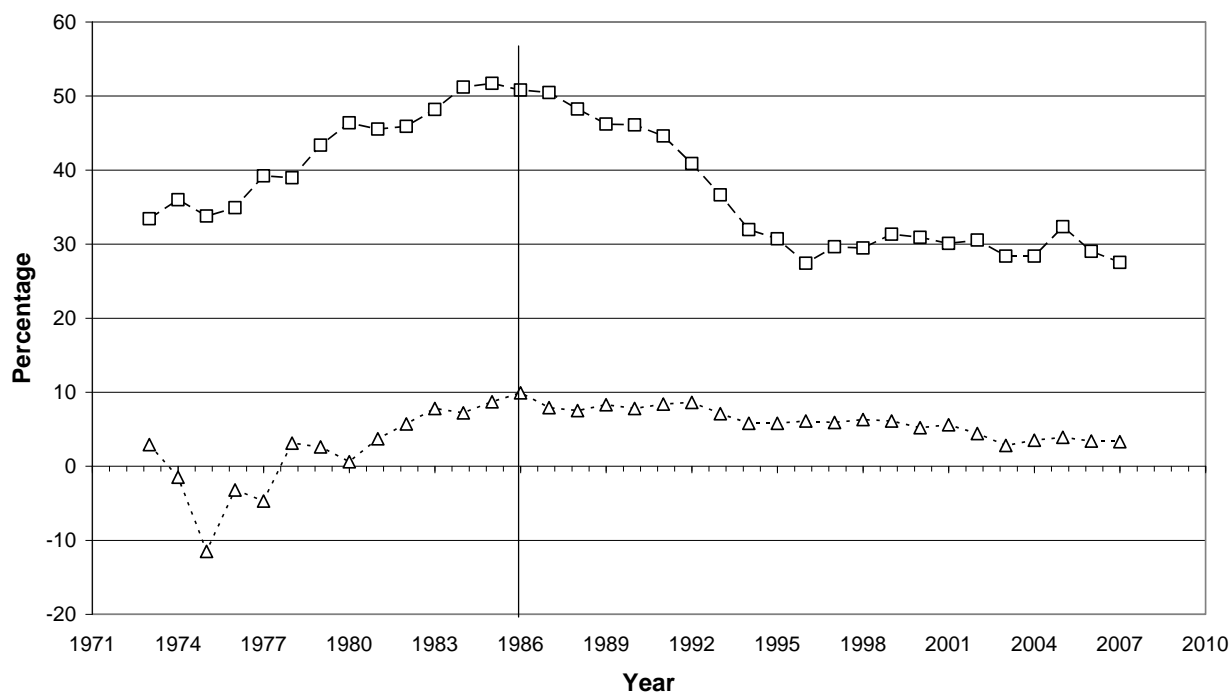
Updating Harrison and Tranter's Growing Sources or Risk in UK Agriculture

This section examines how Harrison and Tranter's (1989) seven distinct and growing sources of risk have evolved since the mid-1980s in as far as it is possible to do so. It concludes by summarising the extent to which they remain a threat to UK agriculture today.

High interest rates, with a more than proportionate growth in exposure to variable interest rates

Figure 1 and Table 1 show the change in the proportion of liabilities in farming held as bank overdraft and the trend in real interest rates respectively. The increasing proportion of loans held as bank overdrafts, which is more risky than long-term loans because they are subject to variable rather than fixed interest rates and foreclosure at short notice, up to 1986 is shown. Since then this proportion has fallen to 28% by 2007 as farmers rebalanced their debt structure. Although there has been a 22% reduction, because total liabilities have increased the value of loans held as bank overdrafts has reduced by only 15% (£543 million), a reduction from £3.56 billion to £3.06 billion. This still represents a considerable sum of short-term, unsecured borrowing given the current overdraft freeze and suggests that UK agriculture would be badly affected should banks foreclose on these loans.

Figure 1 Trends in bank overdrafts and real interest rate



- □ - Bank overdraft as a percentage of total liabilities -- △ -- Real interest rate on agricultural loans

Source: Table 9.3 Aggregate balance sheets for agriculture: United Kingdom, and Table 9.6 Interest; United Kingdom, both in Agriculture in the UK (DEFRA, 2009b)

Table 1. Average rate of interest and real rate of interest on bank advances to agriculture

Year	Annual average interest rate on bank advances to agriculture	Real interest rate	Year	Annual average interest rate on bank advances to agriculture	Real interest rate
1973	12.1	2.9	1995	9.3	5.8
1975	12.7	-11.5	2000	8.2	5.2
1980	18.6	0.6	2005	6.7	3.9
1985	14.8	8.7	2007	7.6	3.3
1990	17.3	7.8			

Source: Table 9.6 Interest; United Kingdom. Agriculture in the UK (DEFRA, 2009b)

Nominal interest rates continued to rise through 1986 until 1990, by which time real interest rates had started to fall. Monetary policy gradually brought inflation more under control and declining real and nominal interest rates relaxed interest rate pressure. By 2007 the nominal and real cost of borrowing, at 7.6 and 3.3% respectively, represent a long-term low, reducing the debt burden on businesses, whilst still delivering a real return on savers' bank deposits.

These low interest rates stimulated an increase in total borrowing (Figure 2). Total loans advanced to UK farming increased sharply up to 1985 and continued to rise thereafter but at a slower rate until the mid 2000s. In 2007 liabilities reached £11.1 billion, an increase of £4,026 billion (57%) over the 1986 level. However, total farm asset values had also increased. In 1986, the value of assets held by UK farming had remained at about the same level for 7 years, and they had returned to this level by 1992, when leverage, the ratio of total debt to total assets, peaked at 14.5%. Thereafter, asset values increased faster than liabilities, and leverage fell. By 2007 total liabilities comprised 5.85% of assets which were provisionally estimated to be worth £190 billion. This suggests that agriculture has entered this turmoil from a relatively strong position, and its relatively strong balance sheet offers some protection against a sharp downturn.

However, much of the increase in asset values arose from the growth in farmland values. In the decade leading to 2008, the change in net stock of capital assets fell by £2,371 billion. This reflects a period of low profitability when depreciation (a positive cash flow item) was used to meet living expenses rather than reinvested in new equipment and buildings. This trend was reversed in 2007 and 2008, when profits recovered due to the commodity price boom: in 2008 net stock of capital assets increased by £466 million as farmers replaced worn out equipment and dilapidated buildings.⁴

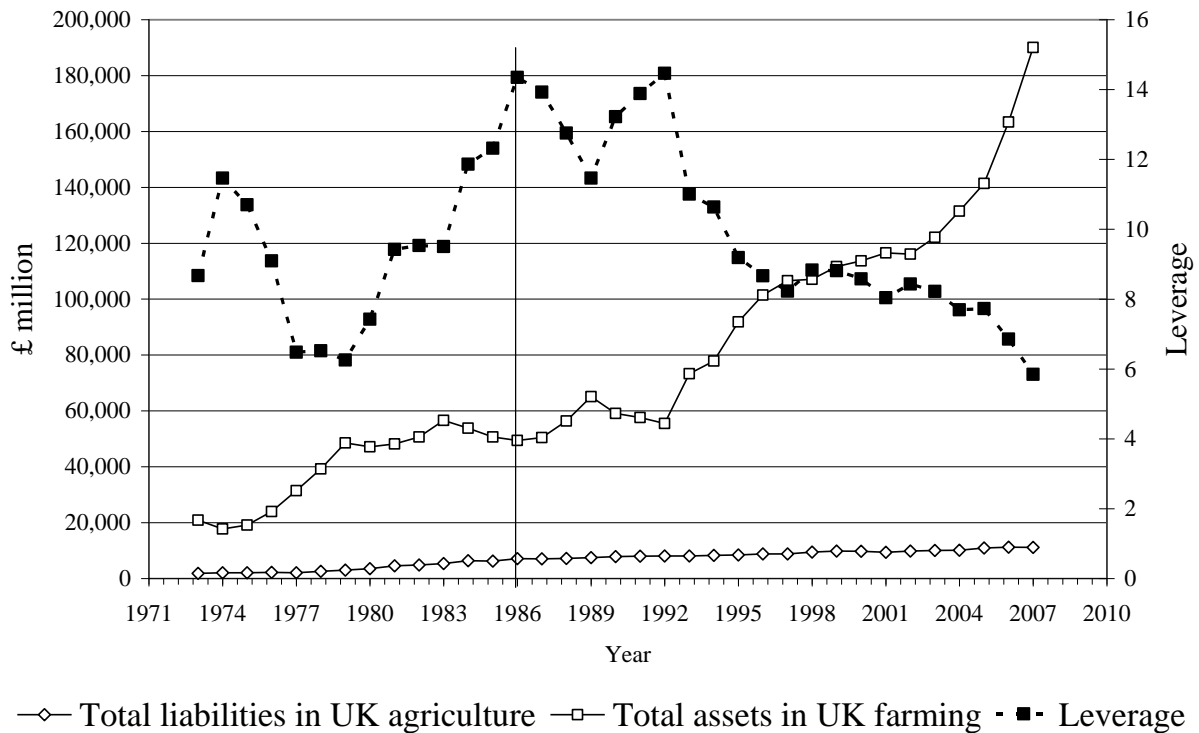
Withdrawal of institutions from land purchase, reducing farmers' opportunities to sell and lease back land

Harrison and Tranter (1989) identified "the virtual complete withdrawal of the Financial Institutions from the land market as purchasers" as a growing source of risk to UK farming because it reduced opportunities "for farmers to sell land and lease it back in order to rid themselves of excessively heavy debt service burdens" (p 61). Figure 3 uses data from DEFRA's "Agricultural land prices and Sales in England" series which detailed the area purchased and sold by buyer's and vendor's background to show that the decline in the years leading up to 1986 extended to 1989. Thereafter, though the rate of disposal of farmland by financial institutions slowed, they remained net disposers every year to 2004, the last year for which this data series is reported, when financial institutions purchased only 67 and sold only 811 ha of land.⁵

⁴ In the decade leading up to 1986 net stock of capital increased by £524 million, though in 1986 itself net stock decreased by £337 million (all current prices).

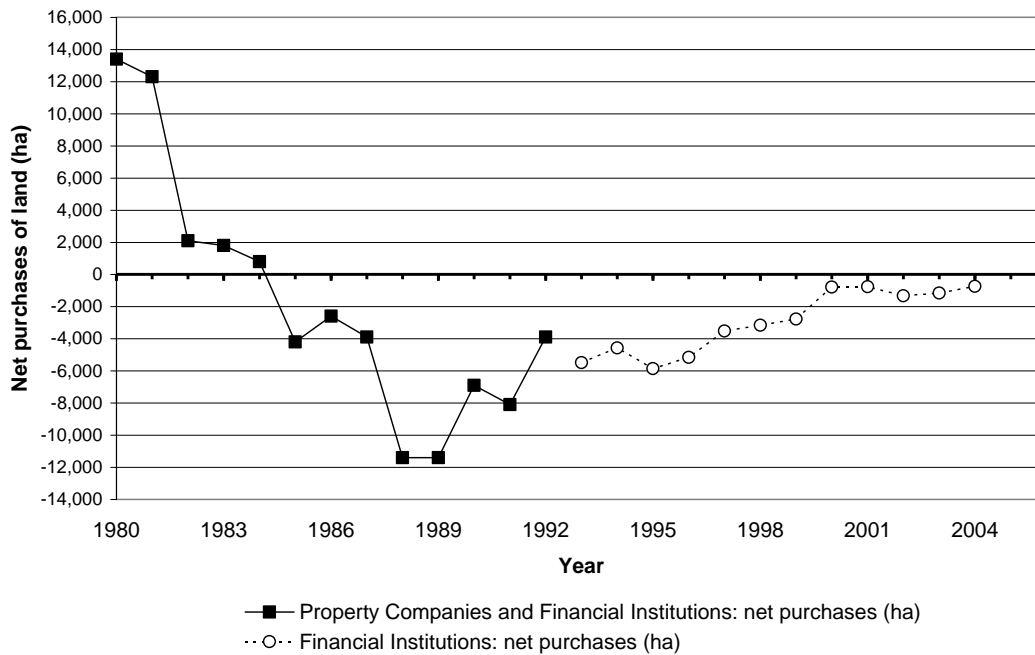
⁵ This data was collected by the Valuation Office Agency (VOA) and reported by DEFRA.

Figure 2 Trends in total assets and total liabilities in UK farming, and leverage.



Source: Table 9.3 Aggregate balance sheets for agriculture: United Kingdom; Agriculture in the UK (DEFRA, 2009b)

Figure 3 Net purchases of land (ha) by 'Property Companies and Financial Institutions' (1980-1992) and by Financial Institutions (1993-2004)



Source: Agricultural Land Sales and Prices in England, (DEFRA, 2006), and Royal Institute of Chartered Surveyors (RICS, various)

Data after 2004 are available from the Royal Institute of Chartered Surveyors (RICS).⁶ Harrison and Tranter noted that “individuals, as distinct from institutions, have long dominated the land market in the sense of being statistically the most numerous principals” (1989, p. 61), and this remains so today.⁷ In 2003 and 2004 ‘Non-farmer Individual Buyers’ roughly equalled the number of ‘Farmer Individual Buyers’ at 43-44% each. By 2007 the single largest purchasers of farmland was ‘Individual Farmers’, their share of all buyers in the second half of 2007, both halves of 2008 and the first half of 2009 was 50%, 56%, 60% and 62% respectively.

The reduction in demand for farmland from life-style buyers as the credit crunch deepened, resulting in redundancies and reduced bonuses, shows that farmland prices were increasingly established by working farmers. Land prices jumped by an average of 24%, from £10,439 to £12,965, in the first half of 2008 following the sharp increase in commodity prices (RICS, Jan-June 2008) and a continued willingness of banks to lend to agriculture (RICS, July-Dec 2008). However, there is now a “widespread perception among surveyors that growth in farmland prices is likely to have reached its peak in H1 [i.e. the first half of] 2008” (RICS, July-Dec 2008, p. 1), as non-farmer and foreign demand for rural properties and farmland declined still further in the early months of 2009 (RICS, Jan-June 2009).

Land has traditionally been seen by Financial Investors as a safe haven for their investments: whether they are likely to return to investing in farmland is likely to depend to some extent at least, on the success of the international response to the credit crisis, much of which has yet to be delivered (HM Treasury, 2009, p. 18).

Diminishing of within-the-family funding sources increases the splitting-up of farms on the death of the owner.

Harrison and Tranter drew upon evidence from a large-scale survey of farms, confirmed by bank managers, to report that “the years of rapidly rising land values – and of prices generally – caused many members of farming families (often brothers and sisters) who had been left farm assets, under terms which excluded them from equity participation and therefore capital gains on them, to demand that their shares be paid in cash” (Harrison and Tranter. 1989, p. 61-63). One result of this was that “farmers’ debt levels are higher than they would otherwise have been” having “been compelled to borrow from higher cost sources than the low-cost, within-family ones they enjoyed in earlier years, when family ties were stronger and less influenced by narrowly commercial considerations” (p. 63). The absence of a detailed farm survey means this trend cannot be

⁶ RICS publishes information, initially quarterly but since the second half of 2006 biannually, on land purchasers’ background (RICS various).

⁷ Some care must be taken when comparing RICS with DEFRA’s time series as the RICS data reports purchaser background only, and the Great Britain share is estimated by simply averaging the percentage recorded across each of 10 regions.

updated. However, there is no reason to believe that motivations of family members who have been left farm assets have changed, and as asset values have increased more rapidly recently than in the early 1980s (Figure 2), these incentives to extract equity most likely remain, and indeed to have increased in recent years. However, easy access to cheap loans characteristic of the 2000s would have decreased the costs to the continuing farmer of paying out family members thus decreasing the impact of this source of risk today.

Increased dependency on purchased inputs increases price risk and reduces the possibilities of substituting family labour for purchased inputs.

Increased dependence on inputs purchased from the rest of the economy makes farming "subject to additional price risks, and farmers are increasingly unable to substitute low-cost family labour inputs for them - the traditional belt tightening exercise associated with family-farming" (p. 63). The evidence they present to support this increased dependency includes;

- a shift away from livestock enterprises and towards directly crop-based ones (feed and livestock items made up 50% of costs in 1971, 44% in 1985),
- a move towards mechanical and chemical inputs (machinery, fertilizers, and miscellaneous items came to 42% of costs in 1971, 47% in 1985),
- An increasing proportion of farming gross income was required to meet capital replacement and interest charges.⁸

Figure 4 reproduced these time trends to the extent that it is possible. The shift away from feed and livestock enterprises towards crop based ones has continued since 1986. A degree of this shift is related to animal production risk, for example there was a substantial drop in 1996 when it was reported that BSE in farm animals could be transmitted to humans through eating infected meat. Since then, other major and costly farm-animal diseases such as Food and Mouth Disease (outbreaks in 2001 and 2007) and pig diseases have reduced livestock numbers.⁹ The reversal of this trend in recent years reflects the increase in livestock feed costs as a result of the boom in wheat and barley prices. From Harrison and Tranter's perspective, the trend since 1986 suggests an increase the sector's price risk.

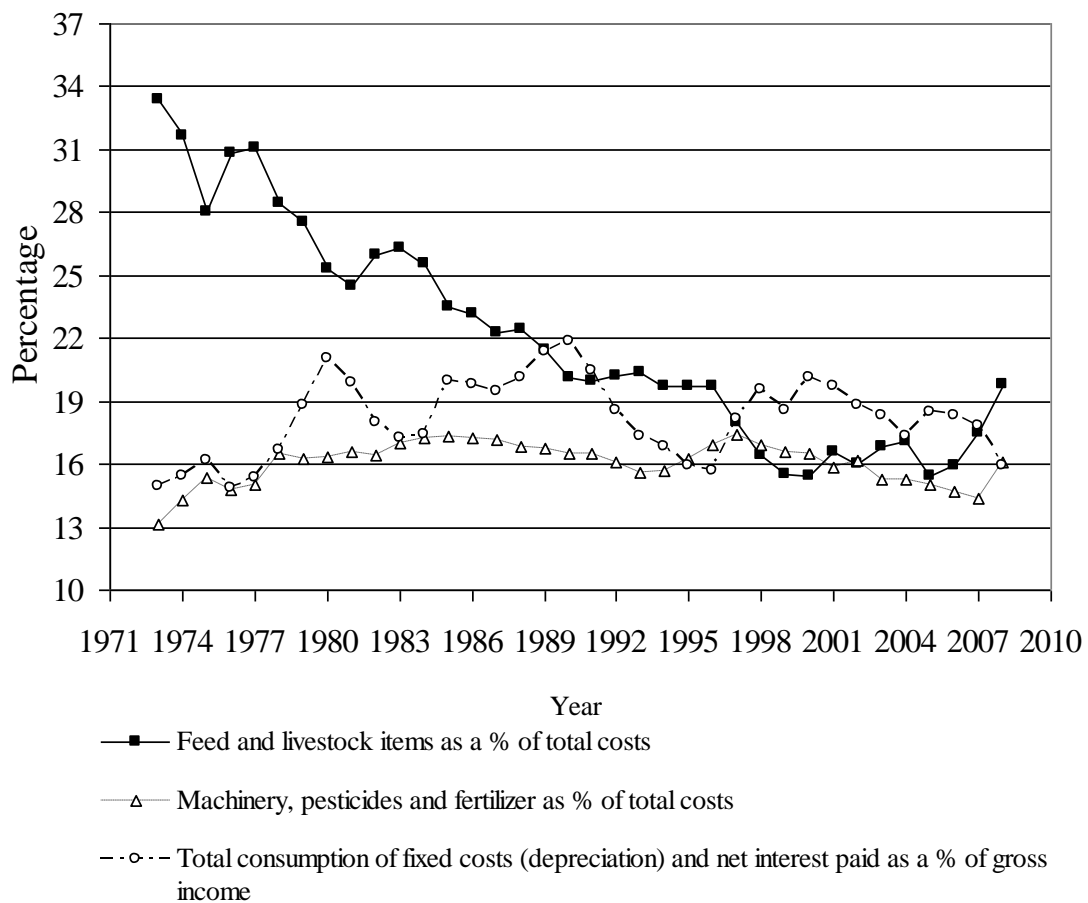
The dependency on mechanical and chemical inputs declined steadily after 1986, rose in the mid 1990s before falling again to 14.4% in 2007. The variability is connected to changes in agricultural policy support payments, the introduction of agri-environment schemes, set-aside (which removed

⁸ The values quoted by Harrison and Tranter (1989), namely "23% of farm gross income was required to meet capital wastage (depreciation) while about a further 10% was required to meet interest charges on borrowing *excluding land purchase debt*" (p 63) could not be reproduced in this analysis. Their text does not provide sufficient references for the sources of data used, and the collection, definition and reporting of data has most likely changed since their analysis.

⁹ Particularly porcine postweaning multisystemic wasting syndrome (PMWS) and porcine reproductive and respiratory syndrome (PRRS).

a variable percentages of arable land from production each year between 1995 and 2007), and will have been influenced to some extent by the growth in registered organic farmers. Figure 4 also shows the trend in depreciation and net interest payments as a percentage of gross income (defined as the total value of crop and livestock, and all support payments). These continued to increase after 1986 to peak at 21.9% in 1990, the year when net interest payment was at its highest. This series shows some volatility as market output value, support payments and interest repayments varied, but have declined steadily since 2005 to 15.9% in 2007. That both these ratios have fallen since 1986 suggests a reduction in the sector's risks related to its dependency on inputs purchased from the rest of the economy.

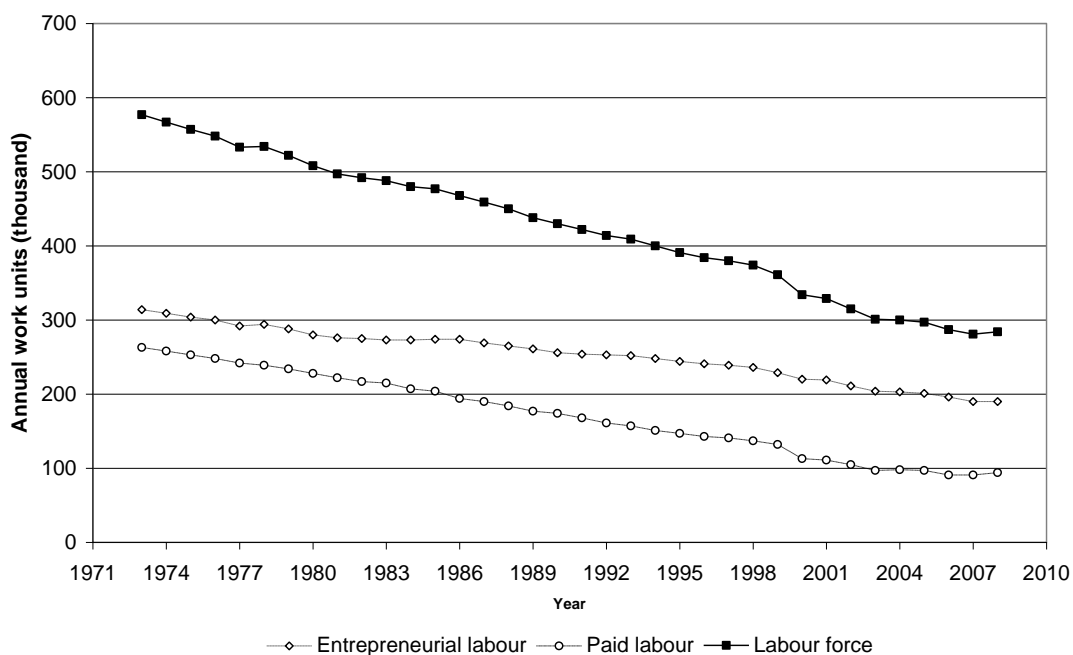
Figure 4. Feed and livestock items as a percentage of total costs, machinery, pesticides and fertilizer as a percentage of total costs and depreciation as a percentage of Total Income from Farming



Source: Index of the purchase price of the means of agricultural production (United Kingdom), and Index of the producers price of agricultural products; (United Kingdom) Agriculture in the UK (DEFRA, 2009b)

Of particular concern to Harrison and Tranter was farmers' increasing inability to substitute low-cost family labour inputs for waged employment, one of the "traditional belt tightening exercise associated with family-farming" (Harrison and Tranter, 1989, p. 63). Figure 5 shows the reduction in both family and employed labour in farming has continued after 1986. As the proportion of the workforce with an equity interest in farming increases and wage employment falls, so the ability to substitute between family and waged labour reduces still further. However, this also means that a larger proportion of the wage bill is paid to people who might more willingly forego a proportion of their salary, at least in the short-term. This increase in flexibility reduces liquidity risk and allows farmers to continue to farm for longer when profitability is low.

Figure 5. The reduction in labour use, highlighting the fall in paid labour



Source: Table 3.8 Labour force in agriculture, United Kingdom, Agriculture in the UK (DEFRA, 2009b).

The continuing deterioration in the sector's terms of trade

Harrison and Tranter (1989) note that in the years leading up to 1986 "inputs are costing more and products are commanding lower prices" (p. 63), leading to a deterioration in the sector's terms of trade. Table 2 compares the change in input and output prices and the sector's terms of trade in the four years prior to 1986 and 2008. The earlier period recorded a decline in the terms of trade by 8.5 points as input prices increased faster than output prices to squeeze farm profitability. This compares with the 0.2% change in the four year period leading to 2007, suggesting no cost-price squeeze. However, during this time input prices increased by 48% and output prices by 46%, these substantial movements suggest the timing of input purchases and sale of product has become more critical pressuring farmers with limited working capital; farmers with access to savings or

credit can benefit by buying inputs before selling outputs if they believe that to be the most beneficial trading strategy.

Table 2. Comparison of input and output indices and terms of trade 1982-1985 and 2005-2008

	Change in input index	Change in output index	Change in terms of trade	Standard deviation	Mean	CV
1982-1985	15	4	-8.5	3.81	97.8	3.89
2005-2008	48.1	46.2	0.2	1.58	96.3	1.64

Source: Index of the purchase price of the means of agricultural production (United Kingdom), and Index of the producers price of agricultural products; (United Kingdom) Agriculture in the UK (DEFRA, 2009b).

Increase variability of farm product prices

A comparison of the coefficient of variation (standard deviation divided by mean price) of 13 items in each of the two three year periods, 1976-78 and 1984-86, allowed Harrison and Tranter (1989) to conclude "farm product prices are more volatile than they were 8 to 10 years ago" (p. 63). Their analysis revealed that "only 3 product groups (fresh fruit, flowers and plants, and eggs) had a narrower spread of prices in the later period than the earlier" (p. 63-64). However, they found that "quite the opposite appears to have occurred on the factor side" (p. 64), with only energy, fertilisers and seed showing more variable price movements between 1984 and 1986 than between 1978 and 1980. With higher variability in product prices but lower variability of factors, Harrison and Tranter concluded that "the evidence relating to price variability is not clear cut" (p. 64).

Table 3 reproduces their analysis, comparing the coefficient of variation for product and factor input prices between two periods, the 2001 to 2004 and 2005 to 2008. Nine of eleven product prices have an increased coefficient of variation, with the index of "total of all products" increasing from 3.8 to 16.3. Seventeen of the nineteen factor input prices have an increased coefficient of variation, with the index of "all means of agricultural production" increasing from 4 to 16.3. Fertilizers, animal feeding stuffs and 'energy and lubricants' reported the largest volatility in the most recent period, all inputs for which substitutes are not readily available.

So the nature of risk related to terms of trade appears to have changed. Farmers have passed on some of the benefit of higher commodity prices to input suppliers, and though they have avoided the price squeeze of the 1980s, they face significant risks related to asymmetric price adjustments: should output prices fall whilst input prices remain high, the sector may experience a sudden and extreme adverse shift in its terms of trade.

Table 3. Change in coefficient of variation of agricultural product prices and factor inputs (between 2001-2004 and 2005-2008)

Agricultural products

	Total of all products	Crop products	Cereals	Potatoes for Consumption	Animals & animal products	Animals (for slaughter and export)	Cattle	Pigs	Sheep	All Poultry	Milk	Eggs
CV (2001-2004)	3.84	4.23	7.58	20.24	3.79	4.61	5.05	4.79	12.04	1.67	4.94	12.55
CV (2005-2008)	16.31	18.90	34.27	18.27	15.01	13.61	15.84	9.56	10.15	16.04	17.55	16.53
Change in CV	12.47	14.67	26.70	-1.97	11.23	9.00	10.78	4.78	-1.89	14.37	12.62	3.99

Factor inputs

	All means of agricultural production	Goods and services currently consumed	Seeds	Energy and lubricants	Fertilisers and soil improvers	Straight Nitrogen ¹	Triple Super Phosphate	Potassic	Compound Fertiliser	Other Fertiliser
CV (2001-2004)	4.04	4.29	3.97	7.01	7.15	8.89	5.86	4.55	6.00	1.57
CV (2005-2008)	16.33	17.87	18.48	21.53	53.73	42.30	75.37	71.44	65.51	6.04
Change in CV	12.29	13.58	14.52	14.52	46.57	33.41	69.51	66.89	59.51	4.47

	Plant protection products	Animal feeding-stuffs	Maintenance and repair of plant	Maintenance and repair of buildings	Veterinary services	Other Goods & Services (General expenses)	Goods & services contributing to investment	Machinery and other equipment	Buildings	Engineering & Soil Improvements
CV (2001-2004)	2.38	3.33	7.00	4.59	3.05	4.66	2.32	0.99	5.73	4.56
CV (2005-2008)	2.81	23.71	6.40	8.27	3.50	3.60	4.24	6.88	7.95	4.89
Change in CV	0.43	20.38	-0.60	3.68	0.45	-1.05	1.93	5.89	2.21	0.33

CV = coefficient of variation $(= (\text{standard deviation} / \text{mean price}) * 100)$

Source: DEFRA (2009a) Index of producer prices of agricultural products: UK

Increased annual volatility of farm incomes

Harrison and Tranter's (1989) conclusion that year-to-year variation in farm incomes had become more volatile in the period from 1981 to 85 compared to the period between 1976 and 1980 is based on comparing the coefficient of variation of 150 individual farms. Comparable data is not available to examine if this remains the case today. Table 4 examines a related, but by no means identical issue, the change in coefficient of variation of Total Income from Farming and Cash Flow measured at the sector level for three periods; between 1982 and 1985, 2001 and 2004, and 2005 and 2008. The comparison shows little difference in the coefficient of variation in TIFF between the three four year periods, but Cash Flow has a considerably higher coefficient of variation in the most recent period. To a large part this is due to the difficulties experienced in the first year of the Single Farm Payment Scheme (2005/06). Many farmers extended their borrowing facilities to tie themselves over this period. Such a strategy, though costly, is possible when credit is plentiful, which is not the case today. This liquidity problem arose directly from changes to agriculture specific policies and confronting a similar cash shortfall – from whatever source - would pose considerable more problems in today's economic climate.

Table 4. Coefficient of Variation for Total Income from Farming, and Cash Flow

Total Income from farming				Cash flow			
	Standard dev	Mean	CV		Standard dev	Mean	CV
1982-1985	439.02	1,871	23.4612	1981-1985	326.38	1,618	20.1719
2001-2004	500.64	2,335	21.4453	1973-1985	564.62	3,064	18.4291
2005-2008	576.21	2,604	22.1320	1995-2007	1202.95	2,277	52.8307
No.	4	4		No.	4	4	

Source: Chart 2.1 Long-term trend in farming incomes in real terms (at 2008 prices), Agriculture in the UK (DEFRA, 2009b)

Summary and Discussion: Current Financial Status

Table 5 summaries the current status of the risks seven risks to UK agriculture identified by Harrison and Tranter in 1989. Some have reduced. These include stable and lower interest rates, a smaller proportion and sum of liabilities held as bank overdraft, strong growth in asset values, which means that although total liabilities have increased, leverage at 5.85% is nearly 10 points less than in 1986 decreasing this source of financial risk. The decline in the livestock sector of farming represents a reduction in opportunities of farmers to add value to the output of their arable enterprises, but the share of purchased chemical and fertilizer inputs to total costs has declined as has total consumption of fixed costs as a percentage of gross income. This reduction in dependence on inputs from the rest of the economy indicates a decline in input price risk. The increase in the

proportion of the workforce with an equity share in the farm suggests on the one hand less substitution possibilities, but as a larger share of the workforce might be willing to forego a proportion of their salary, it also increases flexibility and reduces liquidity risk.

Table 5. Change in the seven sources of risk identified by Harrison and Tranter (1986)

Source of risk that have increased	Sources of risk that have decreased	Change in the nature of the risk	Risks that have not been compared
Lower and stable interest rates.	A 57% increase in total debt.	Concern with the deterioration of terms of trade has been replaced by the extreme volatility of input and output prices with the risk of output prices falling before input prices.	Withdrawal of equity by family members bequeathed farm assets. However, the recent substantial increase in the value of farm assets suggests these motivations may have increased since 1986.
A reduction in the proportion of total loans held as bank overdraft.	Although a smaller percentage of total liabilities, UK farming still borrows over £3 billion in the form of bank overdrafts.		
A fall in sector leverage, to about 5.85%	A continuing absence of financial institutions from the land market.		
A reduced dependency on inputs from the rest of the economy suggests lower in input price risk.	Any fall in demand for farmland and/or residential properties may reduce farm asset values		
An end in the decline in term of trade for the most recent four years, removing this as a source of cost-price squeeze on profitability.	The fall in livestock numbers has resulted in an increase in specialisation among farmers, which increases their exposure to output price volatility	The recent rise in input and output prices has importance consequences for liquidity risks, with access to credit and savings key to managing unpredictable cash flow.	Variability in farm income calculated at the farm level. However, comparisons of aggregate income and cash flow measures suggest no increase in volatility of farm incomes but an increase in volatility of cash flow.
As the proportion of workers with an equity stake in farming increased opportunities for belt-tightening involving delaying wage payments cover a larger share of labour costs.	An increase in price risk following the rapid increase in product and input prices and their increased variable.		
	Further substitution of family for employed labour is increasingly limited.		
	Inefficient introduction of new policies increases policy and liquidity risks.		

Total farm debt has increased by 57% since 1986, whilst lower interest rates have reduced the costs of borrowing. The net effect is a reduction of interest repayments of £137m (from £762 million in 1986 to £625.2 million in 2008). This is still a substantial sum, and calls into question the ability to service this loan should interest rates increase. The data also indicate a continuing absence of financial institutions in the land market. Most land purchasers in recent years have been farmers (RICS Jan-June 2009), and whilst this suggests valuations are based on farmland's contribution to expected farm profitability, the reduction in sale-and-lease-back opportunities removes one route to restructuring farm debt. Whilst the terms of trade has ceased to move against farming removing this as a source of cost-price squeeze on profits, recent years have seen a steep increase in input and output prices, increasing liquidity risk. In recent months output prices have returned towards their long-run means, so if input prices remain high or are slow in adjusting downwards, farming might be faced with a sudden decline in its terms of trade. Any pressure on profitability will reduce the sectors debt service possibilities.

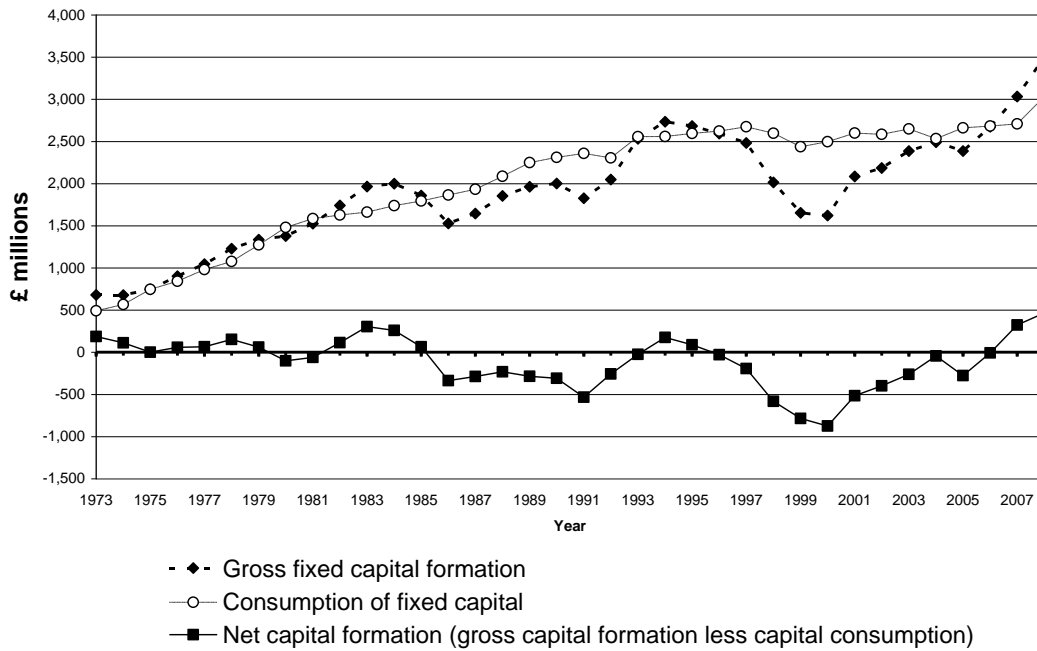
Overall, then, the evidence (Table 5) is of an overall reduction in the risks arising from the seven indicators identified by Harrison and Tranter. But the change in the nature of some of the risks creates some ambiguity as to the final impact, and this makes a clear cut assessment more difficult. It may therefore be sensible to look to other evidence to compare UK farming's current financial status to that reviewed by Harrison and Tranter. In particular, the net capital investment of the sector and the reported bankruptcies and insolvencies in agriculture – both issues Harrison and Tranter drew attention to in their reports (1989; 1994).

Figure 6 shows the levels of investment and consumption of capital assets in UK agriculture. In four of the five years leading up to 1986, UK agriculture recorded net capital formation, but the trend in net capital formation turned down after 1983, with 1986 recording net capital consumption. Cause for concern. More recently, after ten years of net capital consumption (from 1996 to 2005), UK agriculture has recorded three years of net capital formation as farmers use profits to replace worn out capital – a clear indicator of a more profitable trading environment. It would be expected from an inspection of this data, that UK agriculture needed investment for it to continue to retain productivity levels of recent years, and the upturn in investment reflects higher levels of profitability allowing this need to be serviced, putting UK farming on a stronger footing vis-à-vis 1986.

The number of bankruptcies in agriculture can also be used to reflect the financial status of the sector (Franks, 1998). It has another advantage in being based on individual farm data, rather than aggregated sector data which removes critical information about timing (seasonality), location (place) and physical attributes (quality); using aggregate data washes out risk characteristics (Just 2003). Harrison and Tranter (1989, p. 75) refer to the 238 individual and company insolvencies in agriculture in 1986 as being “scarcely an alarming total nationally” as they represented only 1.1% of

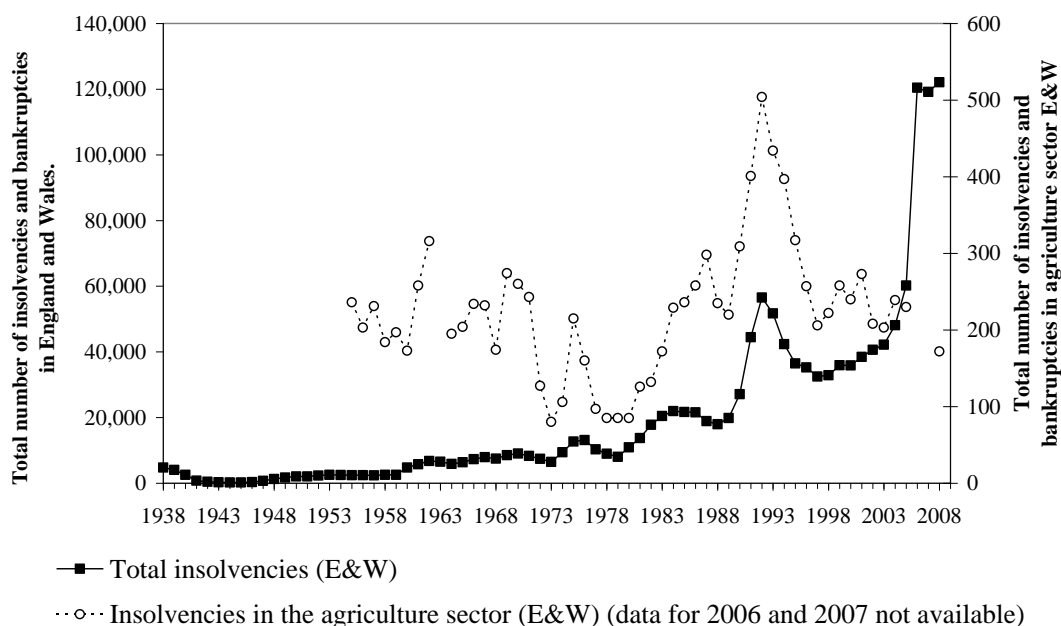
the total bankruptcies and insolvencies in England and Wales that year. However, they write "it is a matter of concern and significance that the total has almost doubled over the last 5 years". Figure 7 shows the basis of their concerns as bankruptcies and insolvencies in agricultural increased, peaking in 1992 at 504 (ONS, various).

Figure 6 Changes in volume of capital assets in agriculture (United Kingdom)



Source: Table 9.7 Changes in volume of capital assets; United Kingdom, Agriculture in the UK (DEFRA, 2009b)

Figure 7. Total UK and agricultural individual bankruptcies and company insolvencies in England and Wales



Source: various statistics releases (The Insolvency Service, 2009)

The high correlation between agriculture and total insolvencies (0.927) in the years from 1980 to 1986 suggests similar underlying causes as the UK economy entered the recession of the late 1980s.¹⁰ In 1986 therefore, both the level and rate of increase in bankruptcies in the agricultural sector were valid indicators of current and future financial stress; it turned out that the level of bankruptcies was a good leading indicator of future financial stress at that time. But does this remain the case? Between 2000 and 2004 the correlation coefficient between total UK and agricultural sector bankruptcies (England and Wales) fell to 0.504, suggests that over those years the level of bankruptcies in the UK economy was not as good a leading indicator of financial stress in agriculture as it had been in the 1980s.

Data for agricultural sector insolvencies are available up to 2008, but unfortunately they are incomplete for both 2006 and 2007.¹¹ The number of agricultural insolvencies and bankruptcies increased from 202 in 2002 to 230 in 2005, this is a similar number to 1986 but at 0.4% it is a lower proportion of total bankruptcies and insolvencies in England and Wales. Total agricultural bankruptcies for the next year in which they are available, 2008, had fallen below the 1986 level, at 172, suggesting a lowering of financial pressure. However, although data for 2006 and 2007 is

¹⁰ Harrison and Tranter (1994, p. 16) attribute the increase in agricultural insolvencies in the late 1980s to the "delay by the farming industry to adapt to its greatly diminished profitability – the cost of growing indebtedness".

¹¹ A major reclassification of businesses resulted in records for separate sectors not being made for three quarters, 2006 Q4, and 2007 Q1 and Q2: 147 agricultural bankruptcies and insolvencies were recorded for the first three quarters of 2006, and 89 in the final two quarters of 2007.

incomplete, there is some evidence that 2008 represented an increase over both previous years, indicating a rising trend that may suggest future financial difficulties.

Between 2005 and 2008 the total number of insolvencies and bankruptcies in England and Wales increased from 62,184 to 122,079 (provisional). The lower proportion of agricultural insolvencies and bankruptcies (0.4%) suggests that the underlying causes of bankruptcy in agriculture had substantially decoupled from the reasons pertaining in the wider economy. Hudson (1986) identified three theoretical causes of bankruptcy is a useful place from which to further analysis the conditions in place in the agricultural sector at the start of the financial turmoil. These are listed below and discussed in turn.

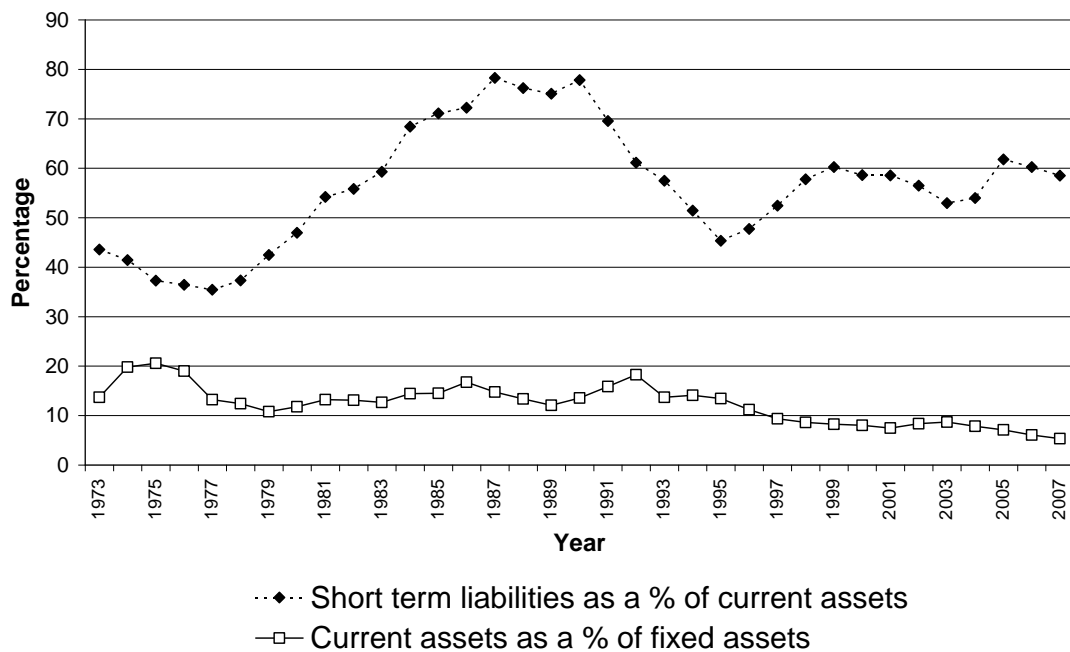
- Negative equity, when liabilities are greater than assets the business is technically bankrupt;
- Inadequate cash flow, which can result in creditors petitioning for bankruptcy to secure the repayment of outstanding loans, or landlords terminating tenancies where rental payments have not been met;
- Uncertain expected profitability.

The data presented above suggests that UK agriculture has benefited from rising asset prices at a time when many businesses and individuals have been exposed to negative equity as the commercial and domestic property markets collapsed. This has seriously unbalanced many businesses' balance sheets at a time when agriculture's balance sheet was benefiting from strong growth in asset prices. Figure 2 shows that UK farming has substantial positive equity, so negative equity is therefore unlikely to be a major driver of any increase in the sector's bankruptcy in the near future.¹² But all businesses have been affected by banks reducing their lending, which has put pressure on their cash flows. The evidence presented above suggests that cash flow management is the biggest single problem in the UK agricultural sector at present.

The credit crisis has also made debt held on short-term bank overdrafts vulnerable to foreclosure. Figure 8 shows the short-term liabilities (bank overdraft) current asset ratio to be 60%, less than the 72% reported in 1986 and the 80% reported in 1991. Although this ratio is higher than in the 1970s, UK agriculture has more than its historically accepted level of short-term loan cover should banks foreclose on loans due to their need to ration credit.

¹² This analysis addresses the agricultural sector as a whole; the absence of a detailed farm-based study means the distribution of equity between farm businesses is not considered.

Figure 8. Debt and asset structure ratio (short term liabilities as a % of current assets, and current assets as a percentage of fixed assets).



Source: Various tables from Agriculture in the UK (DEFRA, 2009b)

Figure 8 also shows current assets to be about 6% of total assets, compared to nearly 17% in 1986. This ratio has been affected by surge in farmland prices in recent years. This surge brings into question the relationship between farmland prices and their intrinsic value. An asset bubble occurs when there is trade in high volumes and at prices that are considerably at variance with intrinsic values. The aim of speculators is to hold an asset whose value will increase, so as to make a profit on their transaction, this continues as long as there is an adequate supply of buyers of that asset. A common pre-condition for an asset bubble to exist is easy access to cheap loans, exactly the circumstances in the UK economy in the 2000s. Is there then is a danger that years of easy access to cheap loans may have generated a bubble in the farmland market? The preponderance of farmer purchasers of farm land would suggest that farmland has been purchased for its value as a business asset, and has therefore, been valued according to expectations about farm profitability and is therefore formed in part on the recent high commodity prices.

This can be examined by inspecting Figure 9. It shows the most recent cycles in farmland value, measured as annual change in real farmland prices (£/ha), and the annual change in real Total Income from Farming (TIFF), measured in £ billions. As the majority of farmland purchasers are working farmers, farmland's intrinsic value is best calculated as the present value of the expected

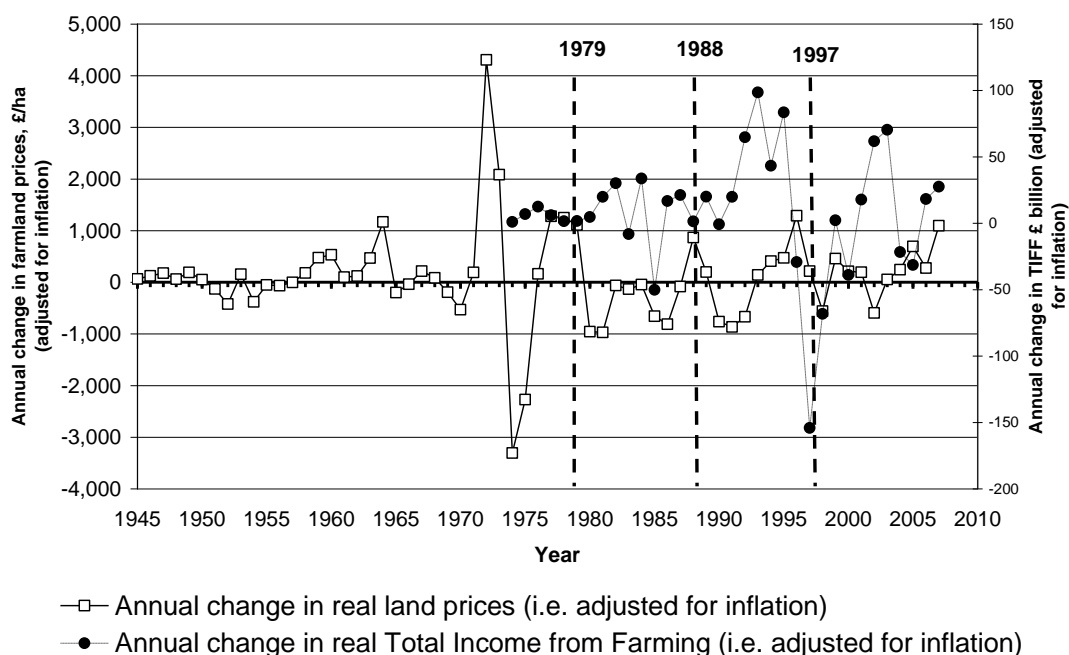
future profitability of farming.¹³ It shows four periods of growth in land price, 1971-3, 1977-9; 1988 and 1994-7, each followed by years of negative growth as the markets readjusted their expectation. For example, farmland prices grew between 1993 and 1997, followed several years of high TIFF, but fell in 1998, following a substantial drop in TIFF. This sort of linkage provides some confidence of a link between farmland prices and farming profitability, which suggests the growth in the preceding years was based on agricultural values, and so did not represent an asset price bubble.

The recent increase in land values between 2003 and 2007 also followed several years of increased TIFF, with the slower growth in 2006 reflecting drop in farming profitability. This suggests that farmland values over this period have also remained linked to farmers' expectations of the profitability of farming. Therefore, any future fall in TIFF would be expected to be reflected in a reduced rate of growth, or fall in farmland values. However, a recent analysis of commodity markets (UNCTAD, 2009, p. 53-84) suggests the extreme scale of recent changes in primary commodity prices (the price boom between 2002 and mid 2008 was followed by a decline across all major categories of commodities) was largely driven by a major new element in commodity trading over the past few years, namely financial investors treating commodities as an asset class. The speculative activities of financial investors that are active in both financial and commodity markets appear to have influenced price movements to higher or lower levels than those dictated by market fundamentals.¹⁴ If this is the case, then whilst farmland values may be based on expectations of the profitability of farming, because expectations are in turn based upon a bubble in commodity prices, farmland may be overvalued.

¹³ Traditionally the intrinsic value of land has been considered the expected agricultural net rent. But this is related to the profitability of farming through time lags dictated by agricultural tenancy legislation. As most land is purchased by owner-occupiers, its net value to the farmer is directly related to the expected increase in profitability to the purchaser. So Total Income from Farming (TIFF) is a suitable measure of its expected intrinsic value to the sector.

¹⁴ "The fact that these market participants do not trade on the basis of fundamental supply and demand relationships, and that they hold, on average, very large positions in commodity markets, implies that they can exert considerable influence on commodity price developments" (UNCTAD, 2009, p. 54).

Figure 9. The annual percentage change in real farmland price and real Total Income from Farming.



Sources: Table 4.3 Agricultural Land Prices, Agriculture in the UK and Chart 2.1 Long-term trends in farming income in real terms (at 2008 prices); United Kingdom (various, DEFRA, 2009b)

It is the interconnections between markets that make differentiating between an asset bubble, a bull market and a boom difficult - and often conclusive identification is only possible in retrospect when a sudden drop in prices appears and the market crashes, and the more speculative gains are quickly wiped out.

The evidence would suggest that UK farming is in a much healthier position than it was in the 1980s and early 1990s. However, the recent changes caused by the credit crisis are not likely to be fully reflected in the data presented above, most of which is only available up to 2007. Therefore the following sector examines some of the implications of these changes on the UK agricultural sector as the crisis unwinds and governments seek to balance their budgets in the UK and across the globe.

Current Finance-related Sources of Risk in UK Agriculture

The evidence suggests therefore that UK agriculture is much better structured to cope with the credit crunch and economic downturn that it would have been in 1986. However, some risks are largely unforeseeable and generally beyond an individual farmer's control, such as the animal disease epidemics which have increased production risk. Other risks can be forecast and appraised, such as the recent proposals to ban selected pesticides (which may have similar consequences for arable sector) (Rickard 2008).

Agricultural production has also been strongly influenced by the incentives created by agricultural policy. In 1986, oversupply and full intervention stores created guaranteed markets and predictable incomes, which removed some incentives for farms to diversify into new farm activities and to develop non-traditional farm enterprises. However, the revisions to support payments in 2005 mean that many of the market-led support incentives have largely changed and be redirected to farmers as direct payments related to the land they farm. And of course, the macro-economic environment in which farms operate, as outlined in the introduction, have also changed. This section examines future sources of finance-related risk to UK agriculture given these changed circumstances.

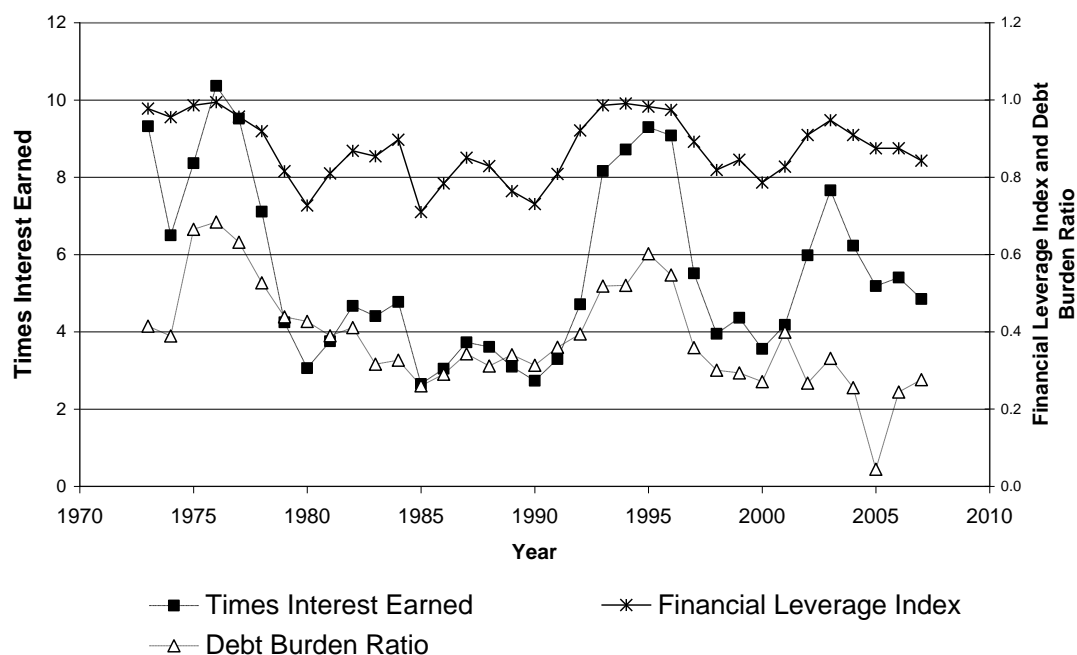
Profitability and cash flow: the ability to payback interest and principle

The importance of the debt-to-asset ratio (Figure 2) is clear as it is used in the context of evaluating insolvency. However, Penson (1987), analysing US agriculture, noted that farmers' ability to service their farm debt was deteriorating long before the debt-to-asset ratio began to rise in the 1980s. He concluded that when used by itself this ratio is a "poor indicator of farm cash flow problems before they become insolvency problems" (p 15). He suggests three ratios to use to predict exposure to increased leverage:

- Times Interest Earned ratio (TIE), dividing total earnings before interest and tax (TIFF plus net interest plus rent paid) by total (net) interest payments;
- Financial Leverage Index (FLI), dividing the rate of return on equity capital by the rate of return on total capital; and
- Debt Burden Ratio (DBR), dividing net cash farm income by total farm debt.

These indices are shown for UK agriculture from 1973 to 2007 in Figure 10. The TIE ratio has fallen from nearly 8 to less than 5 suggests interest payments have risen as a proportion of farm sector profit. The fall in the FLI shows that returns to agricultural assets have fallen in comparison with the costs of borrowing. DBR has also fallen in most years since 2001 (the 2005 value is an anomaly affected by delays in making the first Single Payment Scheme payment), showing the reduced ability of the sector to service its interest payments.

Figure 10. Trends in leverage and other financial ratios



Source: calculated from various tables reported in Agriculture in the UK (DEFRA 2009b)

Whilst UK agriculture has substantial equity, the three debt-service ratios in Figure 9 indicate a growing weakness in its ability to service borrowing from farm profits and cash flow. Though the current Bank of England interest rate is low, these rates have not been entirely passed on to commercial loans as banks seek to recapitalise their balance sheets. These indices therefore suggest reasons for concern if pay-back becomes even more problematic and for DBR and FLI at least, approach long-term lows. In the event that banks call in more of their short-term loans or interest rates rise (to help the recapitalisation process or to reduce expectations of inflation), farmers may need to sell assets to repay loans and principal, which would most likely reduce the growth in farmland prices.

Agriculture sector policy risk

Figure 11 shows the evolution in the dependency of the agriculture sector on government support payments. The substantial decrease in proportion of agricultural commodities and increase in the proportion of subsidy payments after 1992 is explained by MacSharry's reforms, and the shift in 1996 by the BSE crisis. In 2005, the switch to decoupled support payments (the Fischer's reforms) moved the bulk of this support into transparent Single Payment Scheme payments (Franks, 2006). In 1986 direct support payments represented only some 4% of the total value of farm produce, by 2007-8 it was in excess of 15% (down from its peak of 21% in 2005). The recent fall is largely a result of the global commodity price boom, and the proportion of support payments to total output is likely to increase when market prices return to their pre-boom long-run average.

The Single Payment Scheme (SPS) in England sets out future support payments, in Euros, up to 2012. This helps cash flow planning and so reduces financial risk. But the sterling value of these payments depends on exchange rates and level of modulation, both of which are subject to short-term changes. In addition, farmers face end-of-programme uncertainties, in this case revisions to the CAP in 2013. The mid-term CAP health check in 2008 altered the rules relating to modulation. This is a mechanism whereby the EU and Member States can transfer payments from Pillar 1 (guarantee expenditure and single farm payment) to Pillar 2 (rural development and agri-environment schemes). In 2009, compulsory and voluntary (Member State) modulation of farmers in England was 19%, and for amounts over €300,000/farm, 23%. Most of the modulated money (over 80%) is retained by the Member State. It may be attractive, therefore, for governments to use this mechanism to reduce support payments received by farmer without changing the headline level of SPS payments. This threat, however, is reduced by the current obligation on Member States to co-finance modulated money thus drawing additional resources from national treasuries. But these co-financing mechanisms were amended slightly in 2008 and could be substantially revised in 2013.

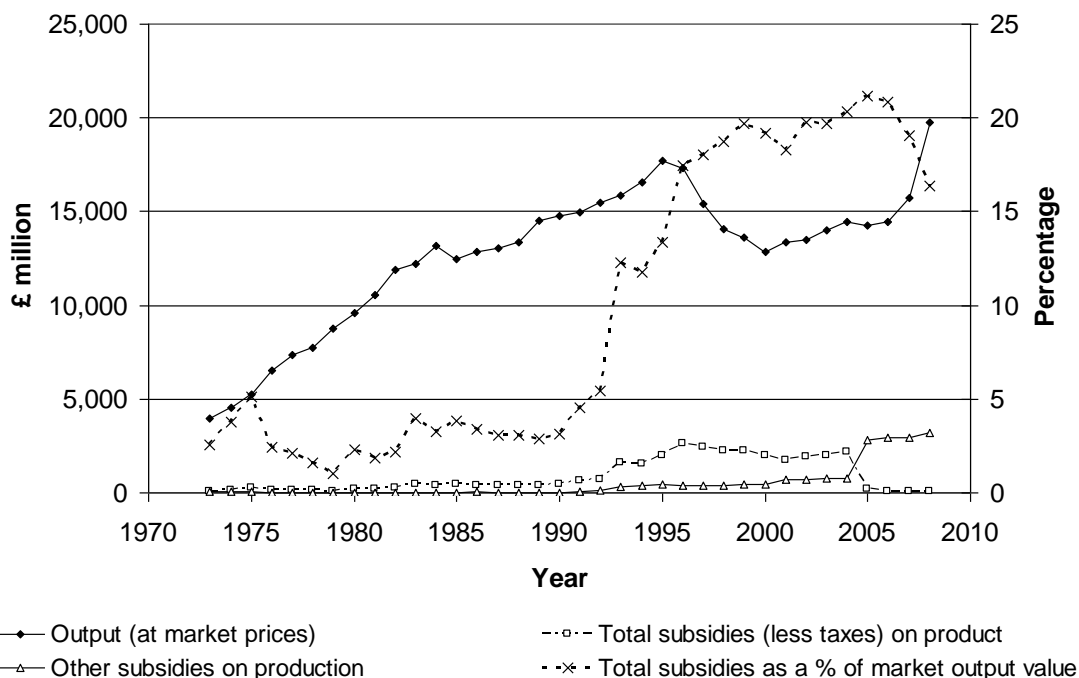
The SPS has increased dependency compared to 1986, but importantly also introduced a new type of risk to agriculture because of their transparency payments made to each farm business can be recorded (FarmSubsidy.org 2009). This allows policy makers to question the notion that all farm businesses require support, and makes arguments for capping and reducing payments to individual farms stronger and administratively possible. Moreover, the recent switch in DEFRA's preferred measure of on-farm profitability, from Net Farm Income to Farm Business Income, also makes it easier to target support payments to households with incomes below some agreed level (Franks 2009a).

Exposure to macro-economic policy: exchange rate risk¹⁵

Direct payments and commodity support prices are set in Euros (before 1st Jan 1999 in ECUs), so payments in sterling depend partly on the exchange rate, and partly on agricultural policies, such as agri-monetary compensation, modulation and financial discipline. Figure 12 shows the trends in sterling exchange rate against the Euro and US dollar. After several years of largely stable and slightly rising exchange rates, sterling steadily depreciated against the Euro for two years from mid 2007, thus increasing the value of SPS payments - a 5% shift in the £/Euro is reckoned to change UK

¹⁵ Exchange rate risk was not identified by Harrison and Tranter as a growing source of risk to UK agriculture. In the mid 1980s the agri-monetary system set the sterling value of European commodity support prices, which at that time were denominated in European Units of Account. The mechanism for setting the green rate changed between 1973 and 1992, in 1986 the green rate was the central market rate times the switchover coefficient. The switchover coefficient changed whenever the spread in monetary compensatory amounts (MCAs) between the strongest and weakest member state's currency exceeded 5 points. The overall effect of this complicated mechanism was to insulate UK agriculture from adverse exchange rate movements in sterling, and to allow it to benefit from revaluations in other member state currencies. The reduction in commodity support prices, and the complete removal of the agri-monetary system, means that UK farming is now more exposed to variations in exchange rates than in 1986 (Ritson and Swinbank, 1997).

Figure 11. Total subsidies paid to agriculture as a percentage of value of agricultural output (at market prices). (Total subsidies (less taxes) on product are payments linked to the production of agricultural products. "Other subsidies on production" include payments not linked to production from which agricultural producers can benefit as a consequence of engaging in agricultural activities e.g. Single Payment Scheme, agri-environment schemes)

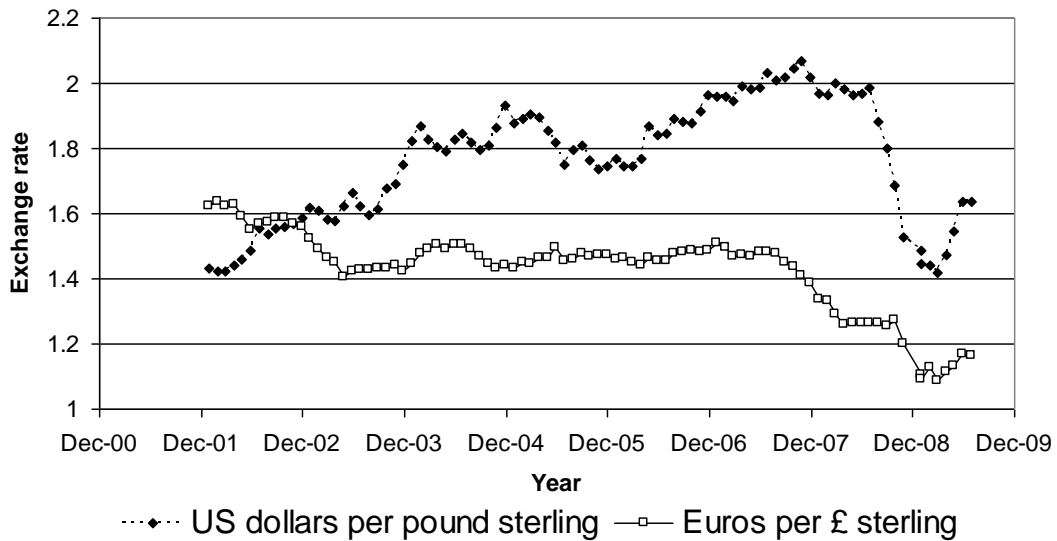


Source: Table 9.3 Aggregate balance sheets for agriculture; (United Kingdom) Agriculture in the UK (DEFRA, 2009b)

total income from farming by £0.3 billion or 15% (Working Group on Risk Management 2003: p 4). Figure 13 illustrates the impact of variations in exchange rates. It shows the difference in direct payments payable to UK farmers given the strongest and weakest sterling:Euro exchange rate between 1995 and 2008 to be 23.25 p/Euro.¹⁶

¹⁶ The actual payments received depend on other factors, such as agri-monetary compensation and modulation, which introduces an element of sector specific policy risk alongside exchange rate risk.

Figure 12. Exposure to macro-economic policy: exchange rate risk (Euro/£)

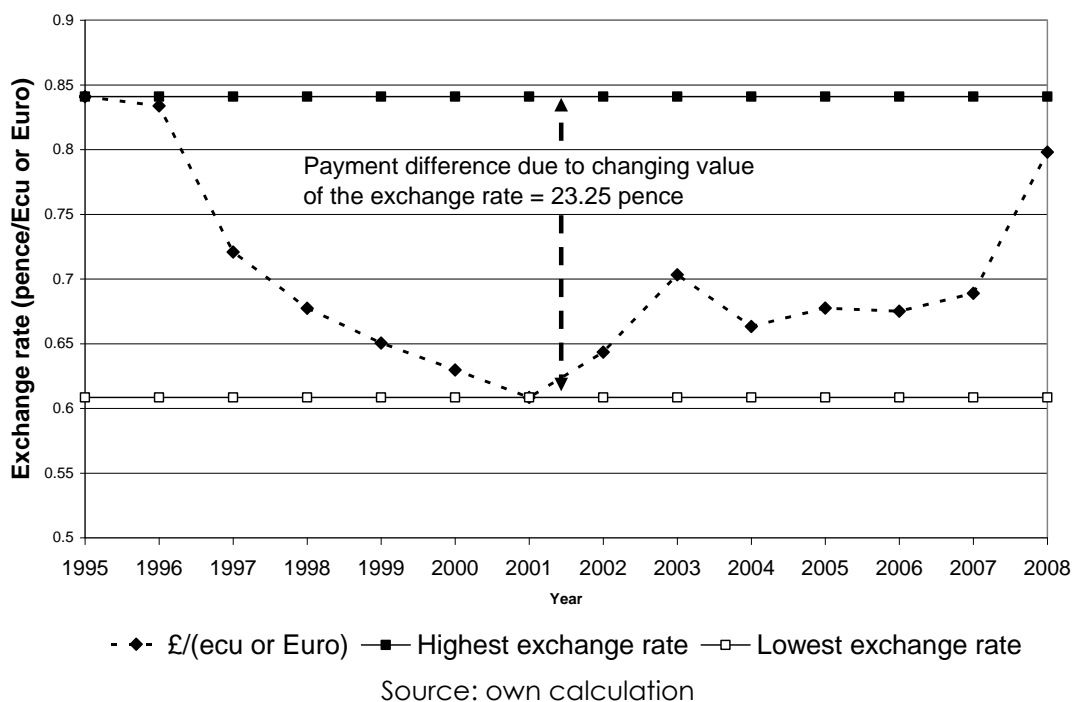


Source: Exchange rates taken from Bank of England website (Bank of England, 2009)

Credit rationing for trading partners (counterparty risk)

A key reason why liquidity dried up shortly after Lehman Brothers was allowed to go bankrupt in September 2008 was that banks did not know how solvent their customers (which included other banks) were. This risk is termed counterparty risk – the danger of the other party in the financial transaction may go bust. Rather than risk lending, banks rationed credit; called in debts and reduced overdraft facilities as they attempted to recapitalise their balance sheets. The extent to which this has happened to UK farm businesses is not known but the increase in lending suggests that the sector as a whole has not been subject to credit rationing. However, farm businesses, like all businesses, face increased counterparty risk, and therefore need to tighten their credit control, and review trading arrangements. The example of the withdrawal of bank funding for the failed farmer owned dairy co-operative, Dairy Farmers of Britain which went bankrupt on 3 June 2009 owing their farmer members an estimated £92 million (DIN, 2009, p. 9), shows the potential losses that can arise from counterparty risk (Pricewaterhouse Coopers, 2009).

Figure 13. Annual exchange rate used to convert arable area payments and single payment scheme payments from ECU/Euros to sterling (1995-2008: values for 1999, 2001, and between 2005 and 2008 estimated)



Future threats: protectionism

In the immediate aftermath of September 2008 financial crisis, G20 leaders met in Washington and pledged that they would not lead the world into a new era of protectionism. However, the full impact of the many and varied government responses, many of which have been unconventional, are not known, and unemployment is likely to continue to rise, and politicians find pressure to protect jobs difficult to resist. A report produced by Global Trade Alert (Evenett, 2009) believes it likely some of these measures will either intentionally or unintentionally discriminate against trade partners: their investigation of 172 state initiatives introduced by G20 nations since June 2009 found that “121 were found to tilt the playing-field against foreign commercial interests. Only 23 of the 121 discriminatory measures related to the imposition of duties following anti-dumping actions, countervailing duties, and safeguards investigations, implying that resort to other means to close borders has been widespread. These findings imply that, on average, a G20 member has broken the no-protectionism pledge every three days” (Evenett, 2009, p. 3). The research found that a large majority of these discriminatory measures are in smokestack (low productivity manufacturing), declining industries and agriculture (Evenett, 2009, p. 18 and their Table 2.8 (p 24)). The effect of a raft of protectionist measures is difficult to estimate, but such a reaction is identified with the worsening of the Great Depression in the 1930s, a period that saw many bankruptcies in farm businesses in the UK.

Economic recession: impacts on farm diversification activities

Harrison and Tranter (1989, p. 22) acknowledged the importance of the increase in income arising from on-farm diversification activities, but a lack of information prevented them including an assessment of this as a source of risk and adjustment strategy in their report. A report on diversification published in the same year as the Harrison and Tranter report, by McInerney and Turner (1989), reporting the findings of a survey of 10,000 holdings in England and Wales, found that "over 40% had at least one non-farming enterprise, with an estimated one third of all holdings in the UK having diversified in some way" (p. i). However, the general scale of operation was "fairly low", with "nearly two thirds of enterprises producing less than £5,000 output and one quarter less than £1,000". One driver of diversification was insecure farm incomes; "as incomes from farming have seemed less secure many operators of agricultural holdings have been looking to see whether any of the [diversified enterprises] were relevant to their businesses. As a result there has been a noticeable expansion in farm diversification in Britain in the last decade" (McInerney and Turner, 1989, p. 58). A later study undertaken by CRR (2003, p. 155) arrived at a similar conclusion, whilst noting that the scale and extent of these activities had grown, as agriculture continued to adjust to new opportunities afforded by the developing rural economy. That study concluded that 58% of holdings engaged in some form of diversified activity.

Definitions of farm diversification have changed over time (Ilbery *et al.*, 2006; Caron and Cairol, 2008), as have sampling frameworks and survey methods, so comparisons between studies are not strictly valid. However, DEFRA has produced a consistently defined time series of diversified activities based on the Farm Business Survey (DEFRA, various)¹⁷ which reported that 51% of farm businesses¹⁸ had some form of diversified activity in 2007/08, a similar percentage to that reported each year since 2003/04. In 2007/08 this activity generated some £400 million of income, 15% of farm aggregate income in that year.¹⁹

This level of resource deployment out of the farming sector directly exposes agriculture to new risks. The majority of this income was generated through letting buildings for non-farm use (39%), whilst other important sources of income include processing/retailing of farm produce (7%), sport and recreation (8%), and tourism (3%). Activities such as these have high income elasticity of demand, and this makes them exposed to any economic downturn. Not all diversification activities are

¹⁷ The definition used by DEFRA, unlike that used by McInerney and Turner, excludes the provision of agricultural services as a diversification activity.

¹⁸ Larger than one half of a Standard Labour Requirement, the size that indicates a full-time or part-time farm business.

¹⁹ But there is a wide variation between farms: for 36% of businesses with diversified activities, diversified income accounted for a quarter or more of the total farm income, and for 22% of businesses, the estimated income from diversification exceeded the income from the rest of the farm business (DEFRA, 2009d, p. 6). Other studies have shown the importance of diversified income to different farming sectors (Franks, 2009b).

successful; they involve financial risk as investments are made into new markets to service uncertain markets, but the likelihood of success remains a little studied subject (McInerney and Turner 1989).

Economic recession: impact on off-farm income

Consistent data is now becoming available about farmer and spouse off-farm employment. In 2003/04 about 24% of farmers (or their spouse's) in England earned off-farm income of, on average, £14,200 (compared to the average income from farming of £17,200). The proportion had increased to 32% in 2007/08 (DEFRA, 2009d). With data on diversification activities and off-farm income becoming available it has now become possible to research (i) the impact of the wider economy on diversified and off-farm income, (ii) the degree of risk-balancing undertaken by farmers, that is the extent to which lower risk from a more reliable income streams permit more risk taking in other income-earning enterprises, and (iii) the fungibility of different sources of farm household income.

Fiscal adjustment: tax increases for the agricultural sector

This analysis has shown agriculture's conservative attitude to credit, and for this reason it is more likely to be less affected by the credit crunch than other sectors. Does this make it a target for a combination of tax increases and spending cuts? Agriculture could be targeted for tax increases, for example it may see a reduction in the sector's tax allowances, such as the loss of fuel-tax relive on red diesel or the loss of VAT zero rating status for food, or the introduction of new taxes, such as a farmland property tax. Removal the zero rate on food might raise £11.95 billion (Adam and Browne 2009). A farmland property tax could be introduced along the lines applied in the USA, where farmland is valued on its agricultural use value which is multiplied by a combined county and state property tax rate to raises some \$4.9 billion annually (USDA ERS, 2009). This might have the additional appeal of expanding the local tax base and so supplement the council tax, the only significant local tax left in the UK (Adam and Browne, 2009).

Summary

The sector's leverage is appears low because of the boom in farmland prices. These prices appear reasonable given the boom in commodity prices. However, there is some evidence that commodity prices have been influenced by trading arrangements that are based on holding commodities as assets, rather than their underlying supply and demand relationships. If this is so, then it is likely farmland is currently over-valued and as such exposing many who hold land as collateral to a risk of a fall in asset values.

Moreover, the measures of payback considered above have all moved against the sector, which suggests that returns to farm assets, and cash flow, are failing to keep up with the cost of borrowing and interest charges. And agriculture remains as heavily dependent on government support

payments as it has for many years, and as these have now become transparently traceable to individual farms, it is now administratively possible to target support payments to support farm incomes according to non-agricultural criteria, such as low-income households.

Whilst this analysis has identified aspects of UK farming's financial structure that may offer cause for concern in the near future, there is little doubt that it entered the turmoil in a strong position. It has reduced its exposure to many of the financial risks identified by Harrison and Tranter in 1986. But is possible that the strength of the sector will make agriculture a target for a combination of loss of tax breaks, increases in taxation and/or reduced support payments as government attempts to reduce its budgetary deficit and public sector debt?

This section has identified seven sources of risk for UK agriculture as it seeks to make its living over the next 10 years or so. The additional exposure of farming to the macro-economy, through policy reforms, diversification, the credit crisis and the recession, has introduced new risks to UK farming. However, it is worth noting there are many other risks, and types of risk. For example, failure to comply with cross-compliance regulations, or to the terms of agri-environment agreements, the proposed withdrawal of some crop and livestock protection agents from 2009 (which may reduce yield and increase yield variability (Health and Safety Executive, 2009; Rickard, 2008)), and changes in the structure of supply chains which continue to drive down farm margins - and as margins fall any remaining income variability becomes more important.

In addition, farmers are being collectively asked to take on more responsibility in the management of farm animal diseases and to finance a high proportion of any costs associated with their eradication (DEFRA, 2009c), thus increasing their costs whilst the effectiveness of the new mechanisms is unknown. Other types of risk have always been with farming, for example the fatality rate. In 2007/08 construction and agriculture had the highest rates of fatal injuries; agriculture and horticulture reported 39 fatalities in 2007, and 487 major accidents in 2006, the last year for which data for this series is currently available. In addition to the financial risks considered in this paper, farmers are exposed to the personal and family risks common to any business, and this often has knock-on consequences for farm prosperity and survival.

Managing risk at the farm level

How can an assessment such as this help farmers? It is true that many of these trends are outside the scope of individual farmers influence. But assuming farmers' main objectives are to remain in business and to increase wealth over time, then what remains true is farmers need to

- (i) get the big decisions right and
- (ii) have sufficient short-term flexibility to cope with different circumstances.

Getting the big decisions right (e.g. land purchase, machinery investment) is critical (Pannell *et al.* 2000; Just 2003). Pannell *et al.*, (2000) cite papers to support the statement that the farmers “most likely to be under acute financial strain at any time are those who brought land or machinery at the wrong time or at the wrong price or who made significant and incorrect major adjustments to their farm operations” (p. 72). Big decisions carry additional importance as they can lead to higher losses, and timing is as always key. However, this area receives less attention from researchers than it deserves. But short-term adjustment to farm management are also important as these can make a substantial impact to farm profitability. Tactical adjustment – doing the unusual - are more often observed in extreme years, both good and bad when optimal management practices may be very different to most years. Doing better than average, especially when many other farmers are having difficulty, has important consequences for farm growth and development. However, retaining flexibility requires access to options and retaining surplus capacity, for example, maintaining a wider range of cultivation equipment than is normally used, increases farm costs. So identifying the optimum surplus capacity to retain becomes a balance between certain costs and unknown benefits. A problem that grows more difficult to manage when a farm is under increasing financial stress.

Conclusions

Harrison and Tranter's 1989 analysis identified seven growing sources of risk. Many of the financial trends their conclusions were based on continued to deteriorate into the early 1990s before farmers put into operation the processes of adjustment – leading to the shedding of costs and control of debt. Some farmers, principally the heavily indebted, were forced out as part of this readjustment, as shown by the level of insolvencies in the agricultural sector which reached 500. It is salutary to be reminded of this history as the UK economy enters the third year of the credit crunch and the second year of a recession. But unlike the late 1980s and early 1990s, the agricultural sector is much more soundly based financially. It has benefited from two years of high commodity prices which has reversed the adverse long-term movement in product prices relative to factor prices, and from a devalued pound. Farmers have used this period of relative prosperity to replace worn-out equipment and some will have replaced short-term bank overdrafts with more secure longer-term loans.

Despite increasing total liability, the sector's leverage has fallen below 6% and net equity increased to £178.9 billion in 2008. Farm asset values have remained buoyant notwithstanding the slump in the housing property market, showing a 59% increase in the price of farmland in the 5 years between 2002 and 2007, with prices continuing to rise through to the first half of 2009. But one consequence of the increase in debt and reduced cash flow leading up to 2007 has been a reduction in the Debt Burden Ratio and gradual increases to interest rates, from 5.6 in 2003 to 7.6 in

2007 have caused the Financial Leverage Index to fall. However, neither DBR or FLI are out of line with historic trends. The increase in interest payments, rising by 46.4% between 2003 and 2008, resulted in the Times Interest Earned ratio falling to the lower end of its long-term trend, indicating some cause for concern as commercial interest rates can be expected to remain high into the foreseeable future as banks seek to further shore-up their balance sheets. And the credit crunch is a source of further concern in the form of counterparty risk, as less well financially structured businesses struggle and banks foreclose, forcing them into bankruptcy or insolvency. The example of Dairy Farmers of Britain, whose bankruptcy appears to have cost dairy farmer members some £92 million is a poignant lesson as total insolvencies in England and Wales exceeded 120,000 in 2006 and 2007, years prior to the seizing up of liquidity in September 2008 and subsequent economic downturn.

Another potential risk is posed by the cumulative effect of changes to agricultural support mechanisms, particularly the increase in transparency of payments and likely revisions in 2013. The cumulative effect of regular, largely piecemeal and incremental reforms introduced since 1986 have radically changed support payments and mechanisms, and this has affected the risks involved in farming. Decoupling support from commodities and coupling it to the area farmed reduces exposure of total revenues to price and yield risks. However these benefits are off-set to some extent by (i) a reduction in commodity price support which increases output price risk, (ii) the increased difficulties of predicting future prices and profitability now markets are increasingly globalised and currently attracting interest from financial institutions, (iii) exchange rate risk as only the Euro level of Single Payments made to each farm are known up to 2012, and (iv) the Single Payments are subject to reduction either through modulation and perhaps financial discipline. Whilst decoupling support may reduce commodity prices, it will benefit some farm sectors, for example, lower cereal prices reduce animal feed costs. As some of these impacts will bring benefit to some sectors, the evidence relating to the net effect of decoupling on risk is not clear cut.

Above all, UK agriculture is now exposed to global price movements. And the globalisation of the financial markets exposes farming to the financial implications of the large public sector debt. Relatively strong sectors, such as agriculture, which have transparent support mechanisms, may be easy targets for a combination of cuts to public sector payments and higher taxes. In 2009, trends in global financial and commodity markets, and the future constraints imposed by the UK's macro-economic policy now appear the most important sources of risk to UK agriculture.

References

- Adam, S. and Browne, J. (2009) *A survey of UK tax system*. Institute of Fiscal Studies.
- Bank of England (2009) Statistics: Interest and exchange rates data. In website, B. o. E. (ed.).
- Caron, P. and Cairol, D. (2008) Multifunctionality: what do we know? In Brouwer, F., van Rheenen, T., Dhillon, S. S. and Elgersma, A. M. (eds). *Sustainable Land Management*. Edward Elgar Publishing Limited, Cheltenham, UK.
- CRR (2003) *Farm diversification activities: benchmarking study 2002. Final report to DEFRA*. University of Exeter, Exeter.
- DEFRA (2006) Agricultural land sale and prices in England. In Department for Environment, F. a. R. A. (ed.), **Vol. ALP 06/4**, National Statistics Office.
- DEFRA (2009a) Agricultural price indices - annual. DEFRA.
- DEFRA (2009b) *Agriculture in the UK*, HMSO, London.
- DEFRA (2009c) *Consultation on a new independent body for animal health. A modern governance and funding structure for tackling animal diseases*. London.
- DEFRA (2009d) *Farm Diversification in England: results from the Farm Business Survey, 2007/08*. DEFRA, London.
- DEFRA (Various) *Farm Diversification in England: results from the Farm Business Survey*, DEFRA, London.
- DIN (2009) I hear ...DFB. *Dairy Industry Newsletter* 21 (9), 9.
- Elliott, L. (2008) Credit crisis - how it all began, *The Guardian*, London.
- Evenett, S. J. (2009) *Broken promises: a G20 summit report by Global Trade Alert*, Global Trade Alert.
- FarmSubsidy.org (2009) Discover who gets what from the Common Agricultural Policy. FollowTheMoney.eu.
- Fildes, N. (2009) EC demolishes Alistair Darling's recovery forecasts, *The Telegraph*, London.
- Franks, J. R. (1998) Predicting financial stress in farm businesses, *European Journal of Agricultural Economics* 25, 30-52.
- Franks, J. R. (2006) Farm futures: some impacts of the Fischler reforms on livestock farming in the North East of England. *Farm Management* 12 (10), 627-642.
- Franks, J. R. (2009a) A comparison of new and previously preferred measures of farm income, *Farm Management* 13 (8), 539-556.
- Franks, J. R. (2009b) Size and non-size effects on the profitability of farms in English less favoured areas, *Farm Management* 13 (7), 485-508.
- H M Treasury (2009) *Budget 2009 Building Britain's future. Economic and fiscal strategy report and financial statement and budget report*, The Stationary Office, London.

- Hardaker, J. B., Huirne, T. B. M., Anderson, J. R. and Lien, G. (2004) *Coping with risk*. Second. CABI, Kings Lynn.
- Harrison, A. (1989) *The changing financial structure of farming*. University of Reading, Reading, UK.
- Harrison, A. and Tranter, R. B. (1989) *The changing financial structure of farming*. CAS, Reading University, Reading.
- Harrison, A. and Tranter, R. B. (1994) *The recession and farming: crisis or readjustment?* University of Reading, Reading.
- Harrison, A. and Tranter, R. B. (1995) Farming through the recession, *Farm Management* 8 (12), 550-562.
- Health and Safety Executive (2009) *Proposal for a regulation of the European Parliament and of the Council concerning the placing of plant protection products on the market: Summary impact assessment*.
- Hudson, J. (1986) An analysis of company liquidations, *Applied Economics* 18, 219-235.
- IFS (2009) *The IFS green budget: January 2009*, Institute for Fiscal Studies, London.
- Ilbery, R., Maye, D., Watts, D. and Holloway, L. (2006) *Research into the potential impacts of CAP reform on the diversification activities of tenant farmers in England - baseline study*.
- IMF (2008) *World Economic Outlook October 2008*. International Monetary Fund, Washington, USA.
- Johnson, C. (1986) The balance sheet of British agriculture, *Agriculture and Food Statistics Group conference*.
- Johnson, C. (1990) Farmland as a business asset, *Journal of Agricultural Economics* 41 (2), 135-148.
- Just, R. E. (2003) Risk research in agricultural economics: opportunities and challenges for the next twenty-five years. *Agricultural Systems* 75, 123-159.
- Marshall, J. (2009) *The financial crisis in the US: key events, causes and responses*, House of Commons, London.
- McInerney, J. and Turner, M. (1989) *Patterns, performance and prospects in farm diversification*, Exeter.
- Miller, A., Dobbins, C., Pritchett, J., Boehlje, M. and Ehmke, C. (2004) *Risk management for farmers*, West Lafayette, Indiana, USA.
- Nguyen, N., Wegener, M., Russell, I., Cameron, D., Coventry, D. and Cooper, I. (2005) Risk management strategies by Australian farmers *15th International Farm Management Congress*. IFMA, Campinas, Brazil.
- ONS (2009) *Public sector finances*.
- ONS (various) *Annual Abstract of Statistics*. ONS, London.
- Pannel, D. J., Malcolm, B. and Kingwell, R. S. (2000) Are we risking too much? Perspectives on risk in farm modelling, *Agricultural Economics*, 23, 69-78.

- Penson, J. B. J. (1987) Evaluating financial trends in agriculture, *Agriculture Financial Review* 47, 14-20.
- Pricewaterhouse Coopers (2009) *Dairy farmers of Britain limited - receivers and managers appointed. Receivers' report to creditors, members and ex-members.*
- Rickard, S. (2008) *What price protection? An economic assessment of the impact of proposed restrictions on crop protection substances.* Health and Safety Executive.
- RICS (Jan-June 2008) *RICS Rural Market Survey H1 2008.* London.
- RICS (Jan-June 2009) *RICS Rural Market Survey H1 2009.* London.
- RICS (July-Dec 2008) *RICS Rural Market Survey H2 2008.* London.
- RICS (various) *RICS rural land market survey: Great Britain.* London.
- Ritson, C. and Swinbank, A. (1997) Europe's green money. 115-137. In Ritson, C. and Harvey, D. (eds.) *The Common Agricultural Policy*, CAB International, Wallingford, UK.
- Stiglitz, J. (2009) For all Obama's talk of overhaul, the UK has failed to wind in Wall Street *The Guardian*, London.
- The Insolvency Service (2009) Statistical Releases. In Skills, D. f. B. I. a. (ed.). Vol. various. BIS.
- UNCTAD (2009) *Trade and Development Report 2009.*
- USDA ERS (2009) Farm household economics and well-being: federal taxes and households. In Service, U. S. D. o. A. E. R. (ed.) *Briefing Rooms.*
- Willcok, J., Deary, I. J., McGregor, M. M., Sutherland, A., Edward-Jones, G., Morgan, O., Dent, B., Grieve, R., Gibson, G. and Austin, E. (1999) Farmers' attitudes, objectives, behaviors, and personality traits: The Edinburgh study of decision making on farms, *Journal of Vocational Behaviour*, 54, 5-36.
- Working Group on Risk Management (2003) *Report of the working group on the use of financial instruments for risk management in agriculture.* Defra, London.