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"Waiting for Godot"- Restructuring on Small Family Farms

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Abstract

This paper examines the extent to which favourable off-farm labour market conditions coupled with growth in land values have contributed to the observed resilience of small scale family farms. We use data from Northern Ireland and employ farm household optimisation models to analyse household decision making processes that contribute to the observed inertia in farm structure. The analysis indicates that farm household behaviour is influenced not just by current farm income, but also expected capital asset returns. Increased wealth, associated with continuing land ownership, gives rise to the proposition that the link between off-farm incomes, increased land values and remaining in farming may be associated with farmers pursuing wealth maximizing objectives, whilst still maintaining a rural way of life. Alongside increased wealth through land ownership the farm household model quantifies the importance of off-farm income removing the pressure from farming income to fund all family consumption needs. This enables households to sustain low-income farming activities in order to pursue other objectives such as wealth management (including tax efficient transfer of wealth) and lifestyle. Consequently, the results indicate that the survival of small-scale family farms may be much less sensitive to agricultural support policies than has been commonly suggested. In an extension that explores the effects of the recent economic turbulence due to the 'credit crunch' we find that the households remain resilient even when subjected to a protracted period of reduced off-farm employment.

JEL Codes: C61,Q12

Key words: Farm households, resilience, wealth accumulation, off-farm income

1. INTRODUCTION

Throughout Europe, small scale family farm businesses have long been considered the backbone of rural society. The promotion and preservation of family farms has been a core objective of successive Common Agricultural Policy (CAP) reforms, the rationale extending well beyond economic arguments to embrace concerns such as the fabric of rural society and protection of the countryside (Commission, 2002). Farmers' organizations have often argued that future existence of such businesses is almost entirely dependent on agricultural support policies. However, research evidence indicates that the survival of small scale family farms as active production units is less sensitive to such measures than is commonly suggested. Small scale holdings in many European Union (EU) countries have shown remarkable resilience in the face of declining real farm incomes and a widening gap between farm and non-farm earnings. In this study we define small-scale family farms as those under 8 European Sized Units[1] (ESUs) and generally not big enough to provide full-time employment for one person. Using data from Northern Ireland this article examines the extent to which favourable off-farm labour market conditions coupled with growth in land values has contributed to the observed resilience of small scale family farms. The central argument of this paper is that, in this context, part-time farming reflects a rational economic choice for many households consistent with them maximizing wealth over the long run.
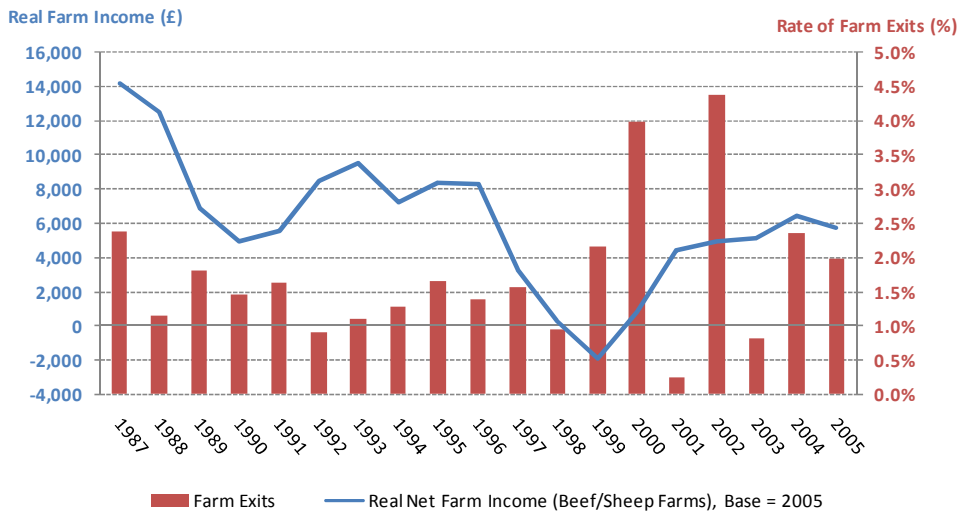

2. THE CONTEXT

The structure of farming in Northern Ireland is not unlike that found in other EU member states. The vast majority of farms are small family operated businesses. The average land area per farm is 31.8 hectares compared to an average of 26.9 hectares for the EU-15. Some 45 per cent of farms (compared to 46 per cent for the EU-15) are small businesses of less than 8 ESUs and generally not big enough to provide full-time employment for one person. About two thirds of the smallest farms specialize in pastoral beef and sheep production.

Despite fluctuations in farm income, there has been a relatively constant rate of exit from the region's farming sector over the past 25 years of almost 2 per cent per annum. Furthermore, there is no statistically significant correlation between the rate of exit from farming and average net farm income (see Figure 1). The farm income crisis in the late 1990s and early 2000s accelerated the rate of exit notably in 2000 and 2002, but in both cases fell below the long run trend in the following years.

The slow pace of structural change among small scale holdings is illustrated by the trends in agricultural land sales and rentals. Annual sales of land in the region have declined sharply from a peak of almost 9,000 hectares in 1982 to less than 1,100 hectares in 2005 (Figure 2). As in many other EU countries, the average price of agricultural land has risen dramatically in real terms since the early 1990s (Figure 2), demand continues to outstrip supply driven, in part, by the growth in demand for commercial and residential development land and the "roll over" relief on capital gains from sale of development land. However, land values have also been enhanced by high levels of direct agricultural support payments following the MacSharry reforms of the CAP in the early 1990s. Capitalisation of agricultural support into land prices has been further reinforced since 2005 through the operation of the Single Farm Payment Scheme which directly ties support entitlements to area of land farmed.

Figure 1   Real net farm income and the rate of farm exit

Real Farm Income (£)   Rate of Farm Exits (%)

Legend: Farm Exits — Real Net Farm Income (Beef/Sheep Farms), Base = 2005

Source: DARD 'Statistical review of Northern Ireland agriculture'**; Deflated by the Retail Prices Index (RPI)**

Figure 2   Aggregate land sales and average real price
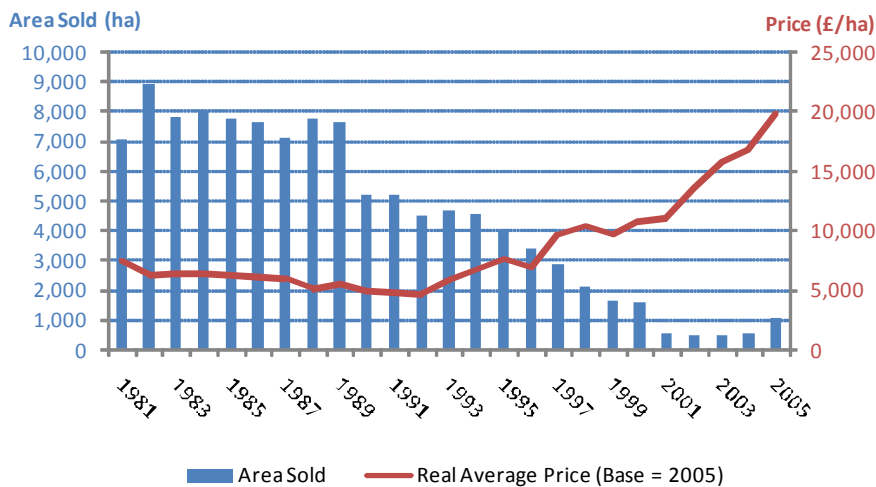
Area Sold (ha)   Price (£/ha)

Legend: Area Sold — Real Average Price (Base = 2005)

Source: DARD 'Statistical review of Northern Ireland agriculture'**; Deflated by the Retail Prices Index (RPI)**

There is little evidence that the reduction in land sales has been compensated for by an increase in land rentals (see Figure 3). The area of land rented annually reached a peak of 365,000 hectares in 2003 but declined to 319,000 hectares in 2007. This decline appears to be related to the operation of the Single Farm Payment Scheme which since 2005 may have encouraged land owners to retain management control of their holdings in order to activate support payments. Overall, the evidence from the land market suggests that the small holders are choosing to actively farm as opposed to passively manage their holdings through renting out their land.

Figure 3   Area of land by type of tenure, 1998 - 2007
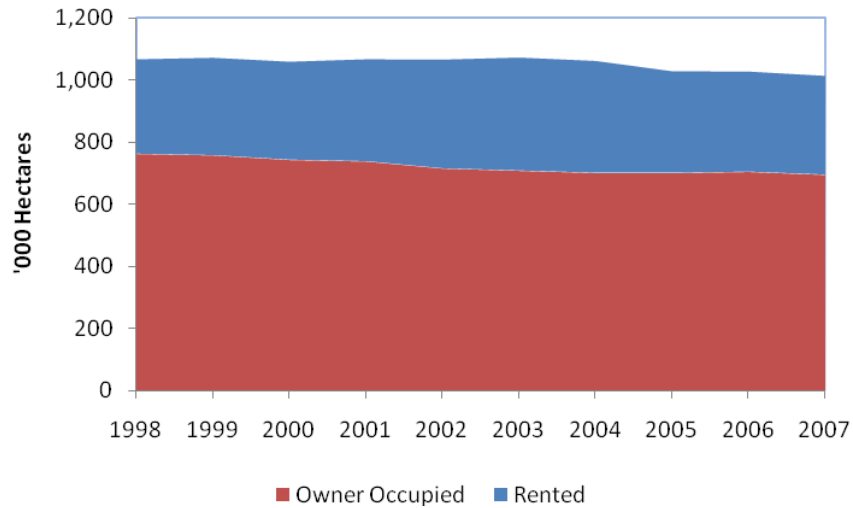
With farm owners below retirement age disinclined to quit farming, the major adjustment strategy, in response to low farm incomes, has been greater participation by the farmers and their spouses in off-farm employment. This trend towards part-time farming, amongst working age farm households, has been facilitated by relatively favourable labour market conditions.   Over the past decade, the economy of Northern Ireland has been buoyant with concomitant expansion of employment opportunities and with modest but sustained growth in real off-farm wage rates (Figure 4).
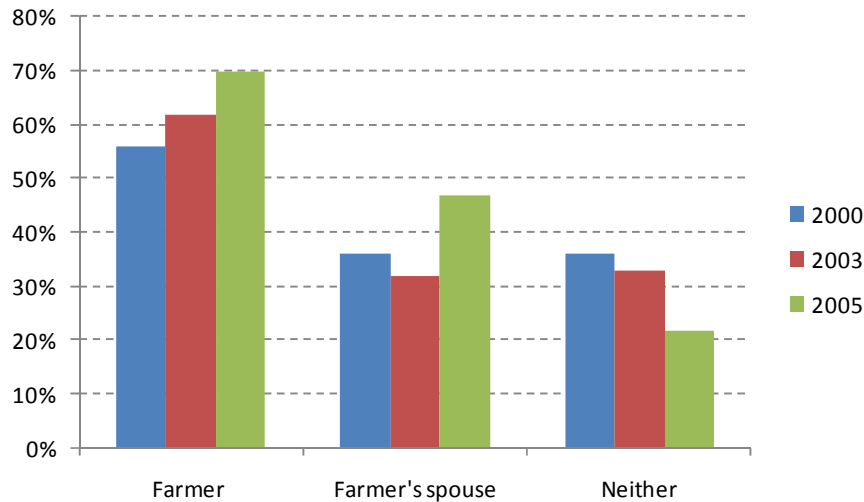
Figure 4   Labour market conditions
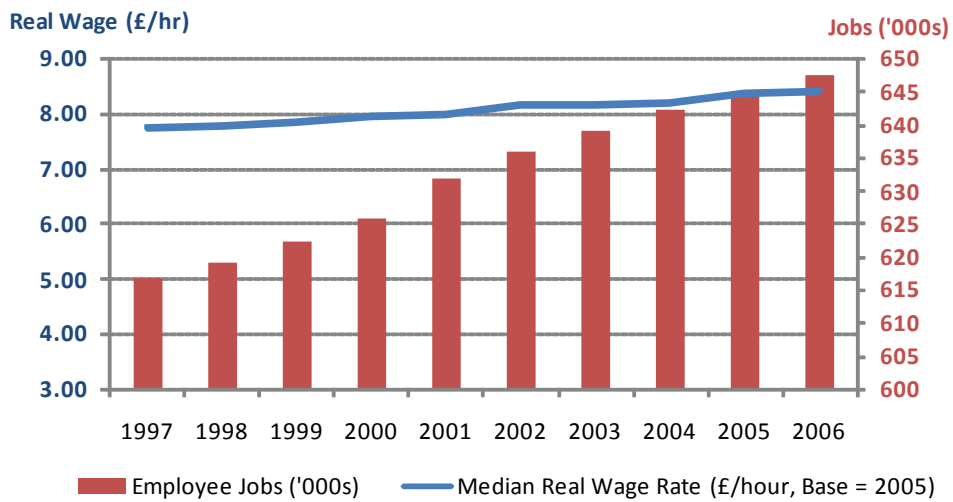
Farm households have benefited from these increased employment opportunities as demonstrated by the trend in the proportion of farm households with other gainful activity (See Figure 5).

Figure 5   Other gainful activity (OGA) on 'very small' farms (for persons under 65 years of age)

3. METHODOLOGY: FARM HOUSEHOLD ANALYSIS

The farm-level analysis uses the dynamic household optimisation model developed by Wallace and Moss (2002). The purpose of the model is to provide a consistent and holistic framework for longitudinal analysis of the effects of policy changes and wider economic developments on farm household decision making. The model incorporates prevailing product and input prices, income tax legislation and a comprehensive specification of developments in agricultural policy. The methodology permits the simulation of farm production, investment, family consumption, off-farm labour supply and a wide range of financial metrics for a farm household over time.

The modelling framework incorporates a Weighted Goal Programming (WGP) specification with a composite household objective function comprising six goals: farm profit, family consumption, farm fixed investment, growth in net worth, leisure time and avoidance of borrowings. The dynamics of farm household adjustment are represented using a recursive formulation with adaptive price expectations. Time allocated to farm and non-farm employment was based on survey data. Total household disposable income was determined through equations which quantified both farm and non-farm income and income tax deductions. Allocation of disposable household income among savings, farm investment and family consumption expenditure is determined endogenously through optimization of the model objective function. The model is estimated using a sequential optimisation process with feedbacks in terms of the realised outcomes of decisions. This modelling framework is depicted in Figure 6. At each optimisation step, household decisions are determined according to a five-year forward planning period. The initial analysis presented in this paper covers the period 1993/94 to 2007/08 and each complete solution therefore involves a sequence of 15 rolling optimisations. In the final part of

the analysis the model horizon is extended up to 2016/17 in order to project a credit crunch scenario for each farm type.

Figure 6 Structure of the farm household model
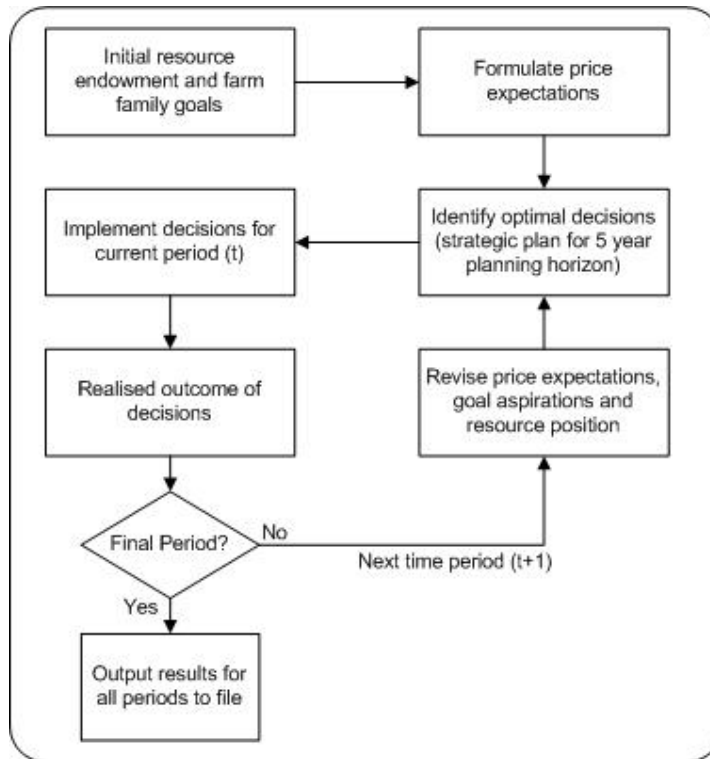
Given the inherent heterogeneity of the farm population it is not intended that the results of the exercise should be generalised to represent all small scale beef/sheep farms within Northern Ireland. In particular, while the production characteristics and physical resources of the farm simulation are averages for samples of very small and small scale beef farms in Northern Ireland, the age profile of the household is younger than the average. This allows the analysis to abstract from succession issues to focus on decision making of the household in the early to middle phase of its lifecycle. In particular, we consider how the choice to actively engage in small scale farming may be economically rationale even for a relatively youthful household for which non-farming opportunities may be quite accessible. The baseline characteristics of the farm households that define the starting points of the simulations are presented in Table 2.

Table 2   Key characteristics of the models

	Very Small (VSBC)	Small (SBC)
Farm size (ESU)	8	20
Farm Size (Standard Labour Units)	0.4	1.0
Adj. land area owned (ha)	22.2	38.4
Farm management efficiency	Average	Good (top third)
Farm enterprises	LFA Beef cows and cattle rearing	
Household structure in 1993/94	Married couple aged 35 with three children (4, 6 and 8 years of age)	

Simulations are conducted for three off-farm employment scenarios (defined in Table 3) which represent common situations on small scale livestock farms in the region. Under the first scenario the farm is operated as a full-time business and neither the farm operator nor their spouse participates in off-farm employment. This scenario is considered only for the small beef cattle (SBC) model which is deemed large enough to provide full-time employment for one person. Under the second scenario, the farm is operated as a full-time business and only the farm operator's spouse participates in off-farm employment. The third scenario assumes that both farmer operator and spouse participate in off-farm employment but that the farm operator's hours of employment are restricted to accommodate the farming activities. This scenario only applies to the very small beef cattle (VSBC) model where low farm labour requirements mean that it is feasible for the farm operator to engage in off-farm work.

Table 3   Off-farm employment scenarios

Scenario	Description
'No Wage' Household	➢ Applies only to SBC farm household. ➢ Household income obtained almost entirely from farming. ➢ Neither farmer nor spouse employee off-farm.
'One Wage' Household	➢ Farm operator's spouse employed off-farm. ➢ Available off-farm employment contract is full-time (37.5 hours per week). ➢ Gross wage rate per hour in each year is median for all employee jobs in Northern Ireland. ➢ Gross annual off-farm earnings of £11,208 in 1993/94 increasing to £17,976 (c. €23,046) in 2007/08.
'Two Wage' Household	➢ Applies only to the VSBC farm household. ➢ Both the farm operator and their spouse have off-farm employment. ➢ Available off-farm employment contracts comprise one full-time (37.5 hours per week) and one part-time (25 hours per week). ➢ Gross wage rate per hour for both jobs in each year is median for all employee jobs in Northern Ireland. ➢ Combined gross off-farm earnings of £19,387 in 1993/94 increasing to £28,651 (c. €36,732) in 2007/08.

The initial analysis spans a 15 year time horizon between 1993/94 to 2007/08. In a follow on analysis, this time horizon is extended a further 9 years in order to explore the short and medium run impact of the economic downturn which commenced in the last quarter of 2008. 'Credit crunch' scenarios are modelled as financial shocks where households face reduced or lost off-farm employment for a two year period 2009-2010 before returning to the labour market in 2011. The details of the scenarios are outlined in Table 4.

Table 4   Description of 'credit crunch' scenarios

Scenario	Description
'Job loss 2009-10'	• Loss of full-time job by <u>either</u> the farm operator or their spouse. • All other off-farm income unchanged. • Applies for two year period 2009 – 2010 before returning to full-time employment in 2011.
'Reduced hours 2009-10'	• Hours of off-farm work of farm operator <u>or</u> spouse reduced to 20 hours (equivalent to a move from full-time to part-time employment). • All other off-farm income unchanged. • Applies for two year period 2009 – 2010 before return to pre-credit crunch hours of off-farm work
'Base scenario'	• No change in off-farm employment.

FAPRI UK projections from a November 2008 baseline (FAPRI 2008) were used to estimate key input and output prices for the extended time horizon of the model.

4. RESULTS
4.1 Household disposable income

The compositional trends in nominal, disposable income for the 'one wage' and 'two wage' scenarios for the VSBC model are shown in Figures 7 and 8 Comparable figures for the SBC household under the 'no wage' and 'one wage' scenarios are shown in Figures 9 and 10. In the case of the VSBC household the majority of household income was obtained from off-farm employment earnings. On average, over the period, farm income comprised only 30 per cent of disposable income for the one wage household compared to approximately 20 per cent for the 'two wage' household. For the SBC household in the 'one wage' scenario, farm income on average accounted for just under half of total household income over the modelled time horizon. In each case there was a small amount of income from non-means tested transfers to families with children (Child Benefit and Child Tax Credits) and some savings interest under the 'two wage' scenario in the case of the VSBC model and 'one wage' scenario for the SBC model. Over the modelled period, farm cash incomes of both households were quite volatile. In the case of the VSBC model average cash farm income was £5,700 p.a. for the 'one wage' scenario and £6,600 p.a. for the 'two wage' scenario. For the SBC household average cash farm income over the modelled horizon was £13,218 p.a. £14,435 p.a. under the 'no wage' and 'one wage' scenarios, respectively. It is interesting to note that the higher off-farm income scenario actually corresponded to higher and, especially in the case of the VSBC model, less volatile farm income. Households with less off-farm income were more cash constrained and could afford only modest capital investment in their farm

businesses. In addition, farm income volatility of the households that were most dependent on farm income was exacerbated by short-term actions taken to avert cash flow problems: for example, the earlier selling of cattle in some years which reduced farm performance and increased income volatility over the medium term, compared to a more consistent strategy.

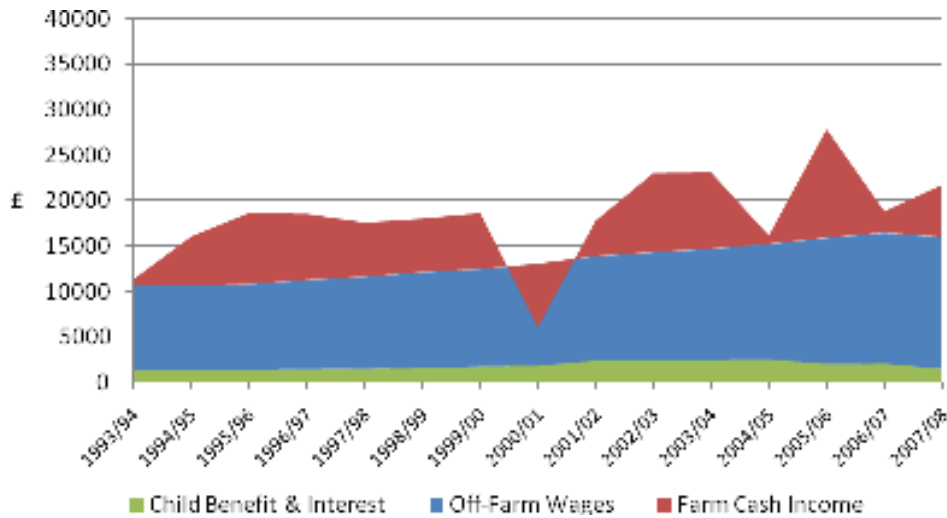**Figure 7** **VSBC: Simulated composition of nominal household disposable income under 'one wage' scenario**

Figure 8 **VSBC: Simulated composition of nominal household disposable income under 'two wage' scenario**
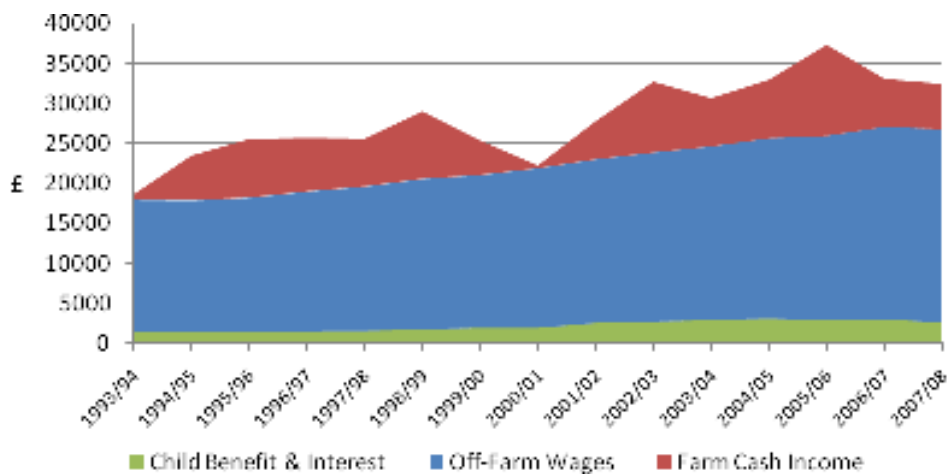
Figure 9 **SBC: Simulated composition of nominal household disposable income under 'no wage' scenario**
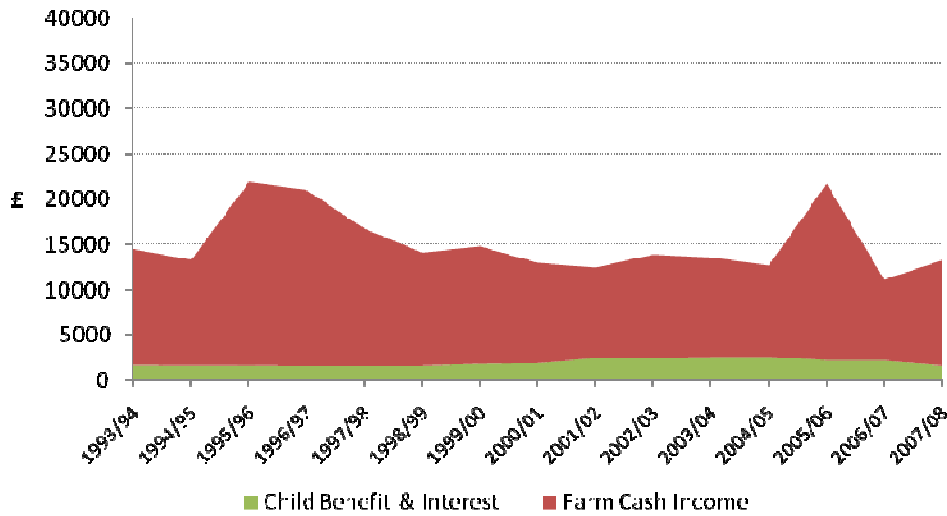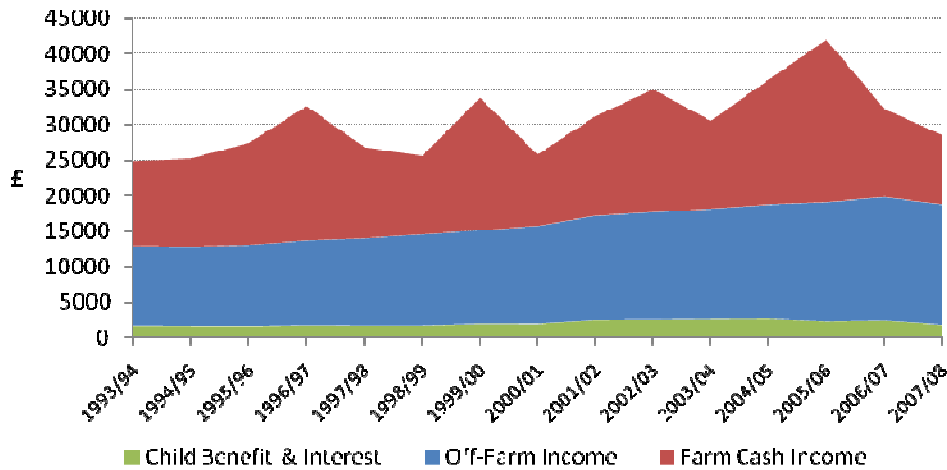

Figure 10 **SBC: Simulated composition of nominal household disposable income under 'one wage' scenario**

4.2 Net worth trends

Appreciation in land values has led to a dramatic increase in the wealth of farm households over the past decade. This effect is reflected in the simulated net worth for the VSBC model (Figure 11) and the SBC model (Figure 12) under the specific off-farm income scenarios. The net worth estimates incorporate the observed increases in average land values. In the case of the VSBC model average annual growth in net worth in nominal terms was 8.34 per cent and 9.59 per cent for 'one wage' and 'two wage' households, respectively. Over the 15 year period, this was equivalent to more than a three fold increase in wealth for the 'one wage' household and almost a four fold increase for the 'two wage' household. In real terms the average annual growth in net worth was 6.4 per cent and 7.6 per cent for the 'one

wage' and 'two wage' households, respectively. For the SBC model average annual growth in net worth in nominal terms was 8.54 per cent and 9 per cent under the 'no wage' and 'one wage' scenarios, respectively.   The nominal trend in net worth for each household assuming constant land values over the period are also presented in Figures 11 (VSBC) and 12 (SBC). In the case of the VSBC model, when appreciation in land values is excluded, nominal net worth for the 'two wage' household increased by an average of just 1.7 per cent per annum, but declined by approximately 1.6 per cent per annum for the 'one wage' household. For the SBC model, when appreciation in land values is excluded, nominal net worth for the 'one wage' household increased by an average of 0.16 per cent per annum, but declined by approximately 1.4 per cent per annum for the 'no wage' household. Clearly, growth in the wealth of these farm households was almost entirely due to the growth in land values over the modelled period.

Figure 11   VSBC: Trend in nominal household net worth 1993/94-2007/08
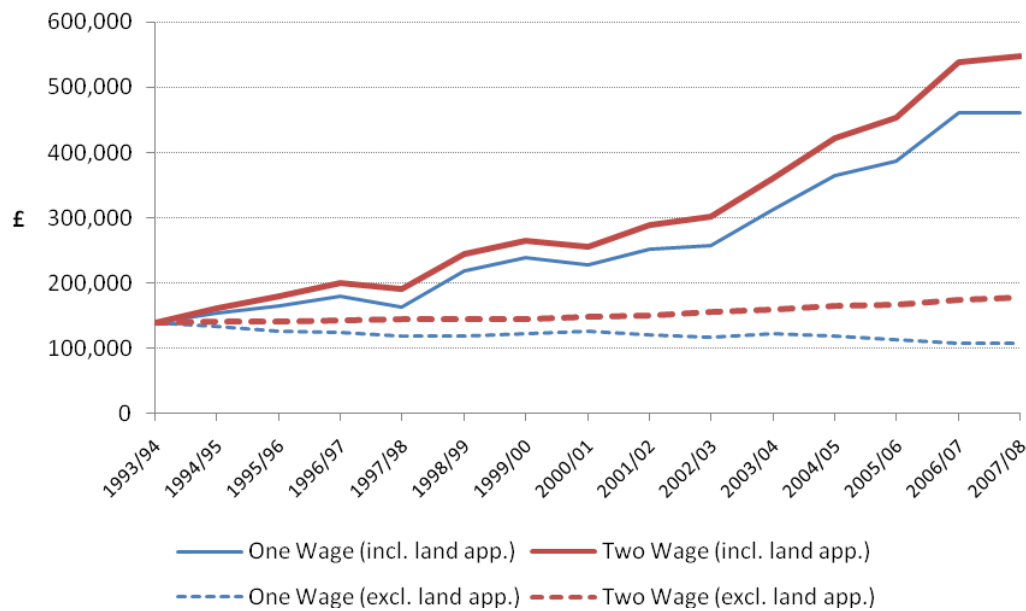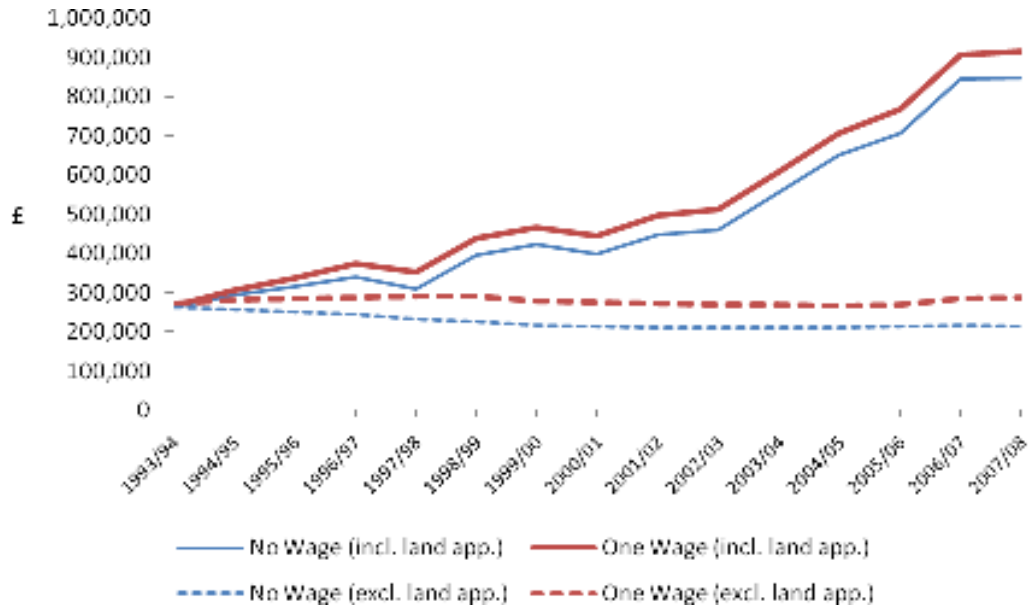
Figure 12   SBC: Trend in nominal household net worth 1993/94-2007/08

Farm investment and family consumption may also be affected by the wealth effect of the land price growth. In the case the VSBC model under the 'one wage' scenario, the level of borrowings by 2007/08 increased from £3,021 to £23,351 as a result of growth in land-based wealth. The extra borrowings financed an increase in annual family consumption of approximately 3 per cent while the level of farm fixed investment over the period almost doubled.

4.3 'Credit crunch' scenarios

An important measure of the resilience of the farm households is provided by their ability to accumulate cash (savings) over time. Conversely, the financial viability households that rely on the expansion of bank borrowings to sustain their activities becomes questionable over the longer term. In particular, such households when faced with a negative economic shock may rapidly become insolvent while households with accumulated cash savings have an important cushion to help them through an adverse economic period. Figures 13 and 14 track the current account balance on 31 March of each year over the modelled horizon (1993/94 – 2016/17). In each chart the economic shock occurs during 2009/10 and 2010/11 and the alternate cash balance projections are shown. The baseline figures relate to the 'two wage' scenario in the case of the VSBC model and the 'one wage' scenario for the SBC model.

Not surprisingly, the 'two wage' VSBC household demonstrates significantly more capacity to accumulate cash (savings) over the horizon. In contrast the 'one wage' SBC household intermittently runs an overdraft for much of the early part of the horizon. In the later years of the horizon cash accumulation picks up which largely reflects more positive FAPRI UK projections for future beef prices. It is important to note that even where overdraft facilities are required, the level of borrowing consistently remains at a modest and manageable level. This position is maintained

by the household cutting back consumption expenditure and deferring farm investment in time periods of adverse cash flow.

It can be noted that the moderate economic shocks do not appear to threaten the long term viability of the modelled households. The scenario presented is probably more adverse than might occur in practice as we have assumed that the household does not receive any redundancy or unemployment benefits. While the income lost through the period of reduced off-farm work is permanent, provided the labour market recovers in the medium term the shock is manageable for each household. Moreover, the modest savings cushion built up by each household during the boom years enables them to adapt to the shock with little impact on household consumption expenditure. However, farm investment is deferred during the economic shock before being restored after recovery in 2011/12.

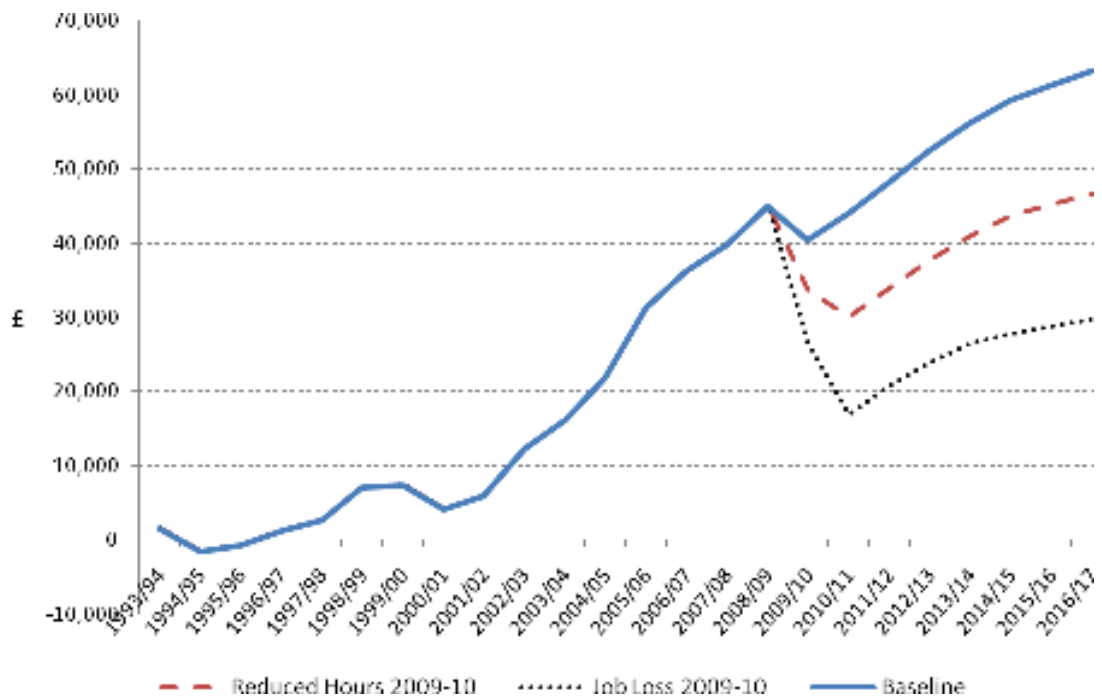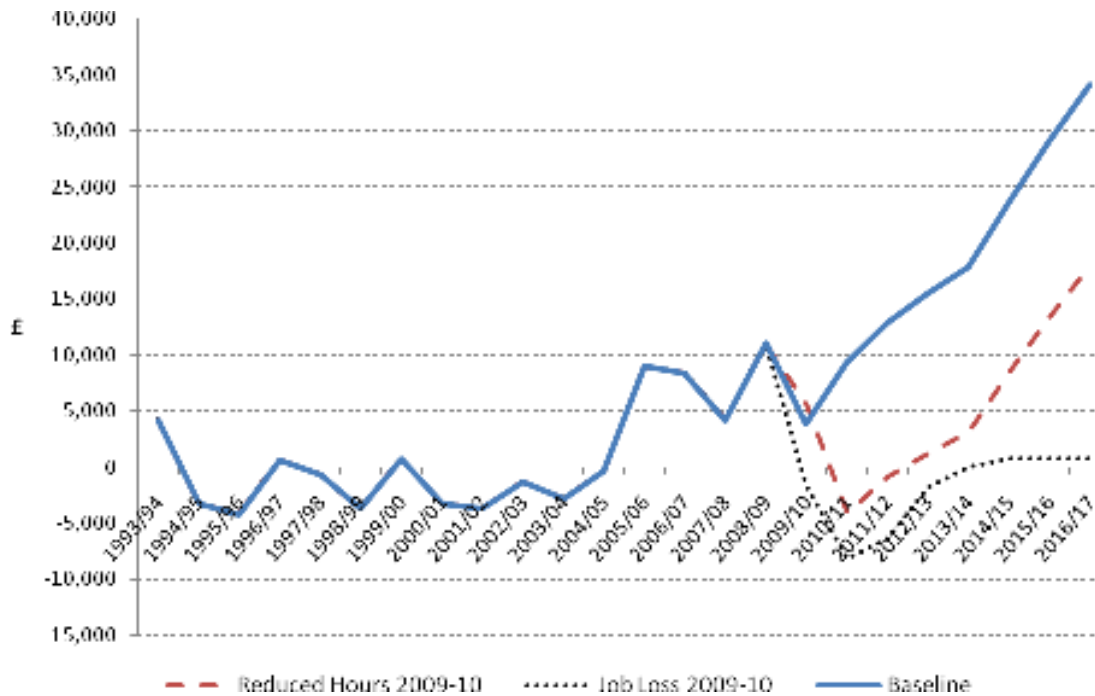**Figure 13 VSBC ('two wage' baseline): Evolution of cash balance**

Figure 14 SBC: Evolution of cash balance

5. DISCUSSION

Agricultural economists and rural sociologists have often hypothesized that the continuation of small scale family farming is a lifestyle choice; the sustainability of these farms reflecting a utility gain from an agricultural way of life, which mitigates the economic losses incurred, (Gasson and Errington 1993). However, other research has suggested that there is sound economic rationale for farm businesses, operating on a small scale, remaining in farming (Hill 2000). For example, Blank (2002) highlights the role of wealth maximization alongside life-style and profit motives.

Our results support this economic rationale by identifying that farm household behaviour is influenced not just by current farm income but also expected capital asset returns. In this context, the observed resilience of small scale beef and sheep farms may simply reflect farmers pursuing a wealth maximization objective. Households are benefiting from increasing land values whilst also enjoying a rural way of life. However, the presence of off-farm income is essential to enabling households to sustain this strategy in the face of low and volatile farm income.

Other factors such as asset fixity and sunk costs are also likely to contribute to structural rigidities in agriculture. Farm households typically will have invested significant capital in specialised assets which have limited salvage value if they cease production. This can be a disincentive to exiting farming as investment costs cannot be fully recovered. The influence of sunk costs on exit decisions and resource mobility has been considered by Chavas (1994).

The results suggest that growth in net worth for an average small scale beef farm in Northern Ireland has been around 9 per cent per annum over the past 15 years. This rate of return which was generated almost entirely by appreciation in land values compares very favourably with returns on alternative investment possibilities.

Moreover, land as a tangible asset is also perceived by some investors to be a relatively stable and secure investment involving less risk than alternatives such as equities. Especially when viewed in the context of the recent economic downturn and the extreme volatility of many financial investments, farming assets may be considered by some households a more secure store of wealth. This taken in consideration alongside the added tax advantages means that farming for some households can be a relatively efficient means for holding and managing wealth over time. However, it is also important to note, that the net worth of farms may also be affected by the fall in property prices in the wider economy and the impact that this has had on development land prices.

Concomitant with increased wealth through land ownership, the study confirms off-farm sources of income and, in particular, income from off-farm employment is important in ensuring the sustainability of small farms. Household consumption demands and farm investment cannot be financed from the income generated by a small farm. The farm household model illustrates the importance of off-farm income in removing the pressure of having to meet all family consumption needs from farming income. These findings are supported by previous research which highlights the smoothing out effect which off-farm income can have in meeting household consumption needs (Mishra and Sandretto, 2002). Even for younger farm households, small scale part-time farming is sustainable as long as households can secure off-farm employment and rely on off-farm earnings to meet a major share of their current consumption needs.

Despite the clear importance of off-farm income in the maintenance of household living standards, the results indicate that small scale holdings are very resilient even when faced with a moderate economic shock. Under the 'credit crunch' scenarios household income was sharply reduced through a reduction in the level of off-farm employment for a two year period. The results showed that the households could manage their way through this shock until recovery of the labour market without severely curtailing consumption expenditure; although farm investment would have to be deferred. This resilience reflects important risk management strategies of small scale farm households. Namely, the households typically have diversified income sources (farm and non-farm) coupled with low borrowings and for many the presence of cash savings. Moreover, under the 'credit crunch' scenarios the reduction in off-farm employment income is compensated to some extent by increased farm income due to relatively strong projected beef prices over the same period.

6. CONCLUSIONS

The capitalisation of agricultural support payments into land values, under successive CAP reforms, may have resulted in farmers being disinclined to sell land, in the expectation of future gains. However, if expectations of further increases start to recede this may influence the rate of farm exit. In addition, an important codicil to this is national taxation systems and their oftentimes favourable treatment of farm businesses. Taxation regulations, particularly income, inheritance and capital gains tax relief may incentivise small farms to remain in business, (See Hill and Cahill 2007).

The growing dependence of EU farm households on off-farm sources of income has clear implications for wider regional economic and spatial development policies. Traditionally farm males have been employed, partly due to their lack of skills and

training in low-skilled occupations mainly in the construction and transport sectors. Much of the female off-farm employment is in the public sector. The economy of many rural areas operates at the equilibrium of low-skills and low-wages (Commission, 2006). With employment concentrated in urban centres, people living in rural areas may lose out on new job opportunities because of a lack of training and/or inability to access employment (Moss *et al.* 2004). This has an even more significant impact during a period of economic decline. Although CAP targeting has, in the past, generally focused on the characteristics of the farm holding, recent decoupling of farm support may present an opportunity for a move towards an allocation mechanism which encompasses a wider range of objectives for rural areas, such as support for a more diversified rural economy, aimed at enhancing quality of life and developing human capital formation. This is in line with current 'CAP Health Check' proposals, with the modulation of Single Farm Payment in order to transfer funding into the Second Pillar rural development initiatives.

Projection of structural change in agriculture requires an understanding of the complex social and economic motives underlying household behaviour. Past trends show that farming activities on small scale holdings are insensitive to agricultural policy changes and fluctuating commodity prices. However, disentangling the causal effects of the specific social and economic factors contributing to this observed inertia remains an important yet formidable task for future policy research. Our findings show that the interplay between increasing land values and wealth management motives are fundamental to explaining future structural change in agriculture.

References

Blank, S.C. (2002). Is agriculture "a way of life" or a business? Choices: The Magazine of Food, Farm and Resource Issues, summer 2002, 26-30.

Chavas, J.P. (1994). Production and Investment Decisions Under Sunk Cost and Temporal Uncertainty. *American Journal of Agricultural Economics*, 76 (1, February), 114-127.

Commission of the European Communities (2002). *Communication from the commission to the council and the European parliament: Mid-term review of the common agricultural policy,* (COM (2002)394 final).

Commission of the European Communities (2006). *Employment in rural areas: closing the jobs gap*, SEC (2006) 1772.

FAPRI UK Project 2008, personal communication.

Gasson, R. and Errington, A. (1993). *The Farm Family Business*. CAB International: Wallingford UK.

Hill, B. (2000) *Farm Incomes, Wealth and Agricultural Policy.* 3rd ed. Ashgate Publishing. ISBN 0-7546-1132-9.

Hill, B. and Cahill, C (2007). Taxation of European Farmers. *Eurochoices,* 6 (1), 44-49.

Mishra, A. K. and Sandretto, C (2002) "Stability of Farm Income and the Role of Nonfarm Income in U.S. Agriculture". *Review of Agricultural Economics*, Vol. 24, pp. 208-221, 2002

Moss, J.E., Jack, C.G and Wallace, M.T. (2004). Employment location and associated commuting patterns for individuals in disadvantaged rural areas in Northern Ireland. *Regional Studies*, 38 (2), 121-136.

Wallace, M.T. and Moss, J.E. (2002). Farmer Decision-Making with Conflicting Goals A Recursive Strategic Programming Analysis. *Journal of Agricultural Economics*, 53 (1), 82-100.