Farm forestry in Ireland

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Abstract

Irish afforestation rates have continuously fallen short of targets set out in national policy objective statements. In this study we develop a panel data econometric model to analyse on-farm afforestation and to provide projections of future national planting rates. We do so by utilising the existing FAPRI-Ireland modelling framework and assuming two policy scenarios for the future. First, we generate projections assuming no change in agricultural and forestry policy will take place over the projection period. Second, we examine how the projections of farm forestry change if existing policy is amended to account for more extensive production practices in the beef and sheep sectors.

Keywords: Farm forestry, panel data model, agricultural policy.

Introduction

Forestry has been identified as playing an important role in the economic development of rural areas, as well as the protection of the environment (An Foras Talúntais 1978). With climatic conditions conducive for tree growth Ireland could be largely covered by forests. However, currently only 10% of the total land area is classified as woodland, placing Ireland on the lower end of the EU ranking of forest cover. In its strategic plan for forestry (Department of Agriculture, Rural Development and Forestry 1996) the government sets out an objective of increasing forest cover to 17% by 2030. This is to be achieved by annual afforestation rates of 20,000 ha, with the emphasis on private planting, in particular by farmers. However, to date planting rates have been consistently below the target. This study aims to explain the evolution of farm forestry in the context of competition between forestry and traditional agricultural enterprises. This is done by the development of an econometric model, which is then used to generate projections of future farm afforestation.

The paper begins by discussing the policy environment in which farmers operate. This is followed by a brief review of previous models of Irish forestry. An econometric model is then specified, which addresses the issue of farmer planting in the light of competition between forestry and traditional agriculture. The next section contains the results of the econometric analysis and the projections of on-farm afforestation rates under two different policy scenarios. The first set of projections is based on the assumption that current EU Common Agricultural Policy (CAP) policy framework remains unchanged for the projection period. This is accompanied by a

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set of projections under an assumed change in CAP measures governing extensification practices in the livestock sectors. In addition, more recent policy developments such as the medium term review (MTR) of the CAP are also discussed. A final section offers some conclusions.

The policy environment

For decades, there has been a continuous increase in forest cover in Ireland. However, cover increased at only a modest average rate of 5,000 ha per annum (Figure 1) over the period 1920 to 1980, when forest cover increased from 1.5 to 5%. Moreover, until the mid 1980s planting had been almost exclusively undertaken by the state. From the mid 1980s government decided to shift the emphasis from state to private afforestation. Consequently, state afforestation has declined over the past decade and the likelihood is that it will remain at a negligible level into the future. Since the mid-1980s, therefore, private afforestation has been the main contributor to the increase in forest cover. In addition, farmers have become the key driver for forestry expansion in recent years, they currently account for 93% of private afforestation. However, despite the financial incentives on offer at a national level, the uptake by farmers has not been sufficient to meet the national target of 20,000 ha per annum. In this section we review the incentives available to farmers under both forestry and agricultural policy.

As stated, it was not until the 1980s that private afforestation began to feature as a contributor to the increase in national forest cover. At that time, the government adopted a more determined approach to improve the position of private forestry in Ireland, enhanced by funds provided for forestry by the then EEC (the Western Package launched in 1981, and followed by Regulation 297/85). It was recognized that forestry should be promoted as a profit generating economic activity, which had an important role in rural development, employment, as well as the protection of the environment. Furthermore, it was considered that farmers should have a central role

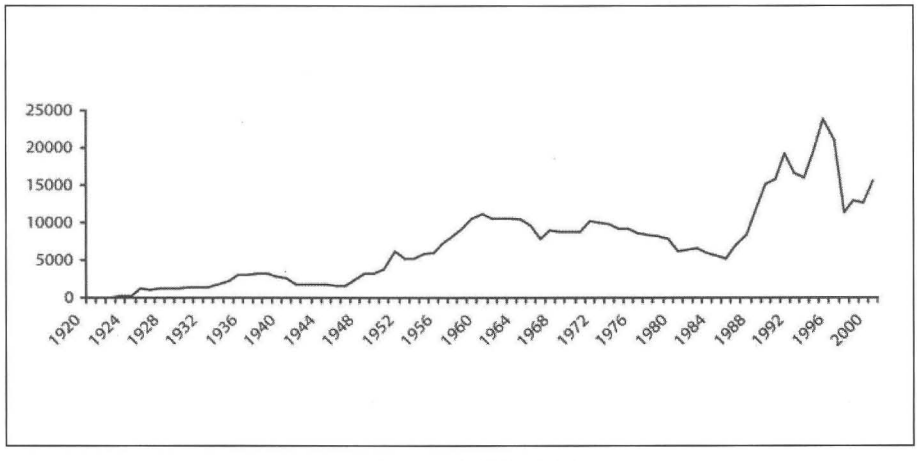

Figure 1. *Annual afforestation over the period 1920–2003.*

Table 1. *Historical development of grant and annual premium payments for 20% diverse conifer plantings (or equivalent) on enclosed land.*

	Grant		*Premium*	
Year	***£/ha***	***€/ha***	***£/ha***	***€/ha***
1981	800	630		
1985	800	630	74[1]	94
1989	1,100	1,397	86	109
1992			100	127
1994	1,500	1,905	225	286
1998	1,800	2,286	270	343
2000	2,250	2,857	308	391

Source: Afforestation Grant and Premium Schemes, Forest Service, Department of the Marine and Natural Resources – various years.

[1] *Paid as a compensatory payment (£30/acre) to only those farmers who were in receipt of headage payments for land which was afforested under the scheme (Connelly 2004).*

in forestry development. In that light, the government has since 1986 been introducing a series of financial incentives to farmers to consider forestry as an alternative farm enterprise. The evolution of available grant and premium payments introduced nationally is presented in Table 1.

Significant increases in afforestation by farmers occurred after the introduction of headage[1] payments in 1986. For the first time farmers who were in receipt of headage payments were compensated on an annual basis for moving out of traditional farming into forestry. The approach of providing direct income support to farmers who undertook farm forestry was further developed by the introduction of annual forestry premium payments in 1989. Further promotion of forestry was implemented in 1992 under the CAP reform and EC Regulation 2080/92, when there was another increase in forestry grants and premium payments. These were followed by more increases in 1994, 1998 and 2000.

Grant payments vary depending on the species planted and the quality of land afforested. Table 1 presents payments for the most representative plantation, defined as a 20 percent diverse conifer plantation on enclosed land (Forest Service, Department of Marine and Natural Resources, Department of Agriculture and Food (from 1 January 2004)). The current afforestation scheme (grant and premium

[1] Headage payments are made to agricultural producers who farm in areas designated as 'disadvantaged'. They are paid per animal farmed, and vary depending on the whether the area is defined as less or more disadvantaged.

payments) is applicable only on agricultural land suitable for forestry. The forestry grant is paid in two instalments. The first instalment is paid the first year after the plantation is established and amounts to 75% of the total grant. The remaining 25 percent is paid after four years, when the plantation is assessed and a decision is made as to whether it complies with Forest Service[2] standards in terms of stocking levels, fencing, drainage, etc. The premium is paid to farmers annually, for 20 years (Forest Service, Department of Marine Natural Resources). A farmer in this instance is defined as a person who derives 25% or more of his/her income from farming. The premium is not paid for reforestation. There are additional schemes, which the farmer-forester can avail of over the life of the crop, such as road construction grants, reconstitution of woodlands scheme, etc.

Although there appears to have been a considerable increase in forestry incentives, economic returns from forestry must be placed in the context of existing agricultural policy. This is particularly important given the degree to which the agricultural sector is subsidised. Traditionally, the CAP supported farmer incomes through guaranteed higher prices. The McSharry reform of the CAP in 1992 witnessed a significant philosophical change in the nature of income support measures used within the EU. Direct payments were introduced and subsequently increased under the Agenda 2000 CAP reforms in 1999, while support prices were simultaneously reduced. From 1993, farmers producing livestock and crops were eligible for various premium payments. For livestock producers these include: suckler cow premium, special beef premium, slaughter premium, ewe premium, rural world premium, headage payment and extensification premium. The introduction of the extensification premium has particularly important implications for farm forestry. In order to qualify for this payment, farmers are required to adhere to specified livestock density limits. Most of these payments are on a per hectare basis and are conditional on the producer engaging in livestock or arable production. Consequently, they increase the marginal product of land remaining in these enterprises relative to alternative enterprises such as forestry. Furthermore, farmers can join the Rural Environment Protection Scheme (REPS), which currently does not allow participation in forestry. Thus, the implication for farm forestry of existing agricultural policy as well as market developments must be examined.

Modelling Irish afforestation rates

In terms of farm forestry Ireland is unusual relative to other EU countries in that land has only been privately afforested (first time planted) at significant levels since the mid-1980s. This is allied to the fact that the country still has a low forest cover. The expansion of forestry implies changes in land use and specifically in this case it implies a contraction of land going to traditional agriculture activities. Potential change in land use is also complicated by cultural and historical factors. There is a

[2] The Irish Forest Service is based within the Department of Agriculture and Food (formerly based in the Department of Marine and Natural Resources) and is responsible for the administration of all government grants and premiums in the forest sector.

relatively small area of mature private forests and hence, the predominance of afforestation over reforestation is a feature. This distinguishes Ireland from what is the norm in many European countries. In Ireland, the first clearfell of farmer-owned forests supported under the arrangements since the mid 1980s is expected to occur beyond 2020; only then will reforestation arise as a major issue.

Studies that deal with the issue of Irish farm forestry and its expansion can be divided into either qualitative or quantitative approaches. Qualitative studies are primarily concerned with revealing farmers' attitude to forestry. In general, their findings suggest that Irish farmers are reluctant to plant their land (Ni Dhubháin and Gardiner 1994, Frawley and Leavy 2001). Gillmor (1998) summarises the factors behind the lack of interest in farm forestry as follows: the insufficient information about forestry and financial benefits, historical reasons, competition for land with agriculture, agricultural subsidies, costs and risks associated with forestry and long-term nature of forestry investment. Data from the Irish National Farm Survey in 2000 (see Burke and Roche (2000) for more details) conducted on 1106 farms around the country indicates that only 6% percent of farmers had planted trees. This reinforces earlier findings that despite the financial incentives available, farmers are reluctant to transfer land from existing agriculture into forestry.

Quantitative studies seek to identify the factors behind private forestry planting by means of econometric analysis. They try to explain the pattern exhibited by private planting using relevant economic, forestry and agricultural factors as determining variables in regression analysis (Kula and McKillop 1988, Barrett and Trace 1999, McCarthy et al. 2002). The key findings in these studies are summarised in Table 2. Most conclude that forestry premiums and grants are highly significant in the decision to plant trees. However, of the three studies only McCarthy et al. (2002) has sought to incorporate agricultural policy levers as well as agricultural market returns.

Table 2. *Factors found to influence the rate of private afforestation.*

Study		
Kula and McKillop (1988)	***Barrett and Trace (1998)***	***McCarthy et al. (2002)***
y_t ***private planting (ha)*** $_t$		
grant $_{(t\text{-}i;\ i=0\text{-}5)}$[1] ***	*forestry premium* $_t$	*forestry grant* $_t$ ***
timber price $_{(t\text{-}i;\ i=0\text{-}5)}$ ***	*agricultural subsidies* $_t$	*forestry premium* $_t$ ***
land price $_{(t\text{-}i;\ i=0\text{-}5)}$ ***	*forestry land price* $_t$	*forestry return* $_t$ ***
agricultural product price $_{(t\text{-}i;\ i=0\text{-}5)}$ ***	*accompanying measures* $_t$	*agricultural return* $_t$
income from alternative $_{(t\text{-}i;\ i=0\text{-}5)}$		*REPS area* $_t$ ***
interest rate $_{(t\text{-}i;\ i=0\text{-}5)}$		
tax $_{(t\text{-}i;\ i=0\text{-}5)}$		

[1] *t-i; i=0-5, where i 0-5 refers to lags used in the regression*

*** *significant at the* $p \leq 0.001$ *level*

Study objectives

The objective of the present study was to develop a model, which would explain the planting patterns exhibited by farmers by explicitly addressing the competition for land between forestry and traditional farming. The model can then be used to generate projections of future planting rates in Ireland. It is designed as an extension to the existing FAPRI-Ireland model. The FAPRI-Ireland model of the Irish agricultural sector is a joint effort of the Food and Agriculture Policy Research Institute (FAPRI) at the University of Missouri, Columbia and Teagasc[3]. It is a dynamic, partial equilibrium model consisting of 200 econometrically estimated equations (for more on the model see Binfield et al. 2000). It compiles a series of interlinking commodity models for the Irish beef, sheep, dairy, crops and inputs sectors. Since 1998 the model has been used to generate an annual series of projections referred to as a 'baseline' result. This result serves as a benchmark, as it represents the projection of key agricultural variables in the absence of any policy change i.e. the present policy climate is held constant for the duration of the projection period. The original FAPRI-Ireland model, which included a land share system for traditional agricultural enterprises, such as cereals and livestock, is now expanded to allow for agricultural land to move into forestry.

Methods

A panel data approach

Over the last decade the proportion of farmers contributing to private planting rates has been continuously increasing. It is expected that for the foreseeable future almost all afforestation in Ireland will be conducted by farmers. In order to project forest cover in the future it is necessary to identify the relationship between planting conducted by farmers and the factors determining it. Hence, our data comprises of private planting conducted by farmers only.

The sample commences in 1986, when private planting first began to feature to a significant extent in national afforestation. While an EU Agricultural Development Programme for the West of Ireland (the Western Package), which provided grant aid for forestry, was introduced in 1981, private planting by agricultural producers did not reach a significant level until the mid 1980s (Figure 2). In 1986, in addition to the Western Package promotion, measures were introduced for the first time to compensate farmers who moved out of traditional livestock production into farm forestry. From this point on, particularly in the western regions of the country, the expansion of farm forestry becomes evident. However, data on farmer planting are only available from 1990 onwards.

Gillmor (1998) states that in the mid-1980s farmers constituted 20 percent of total private plantings. For the four missing observations in the period 1986-1989, it is

[3] The Irish Agriculture and Food Development Agency.

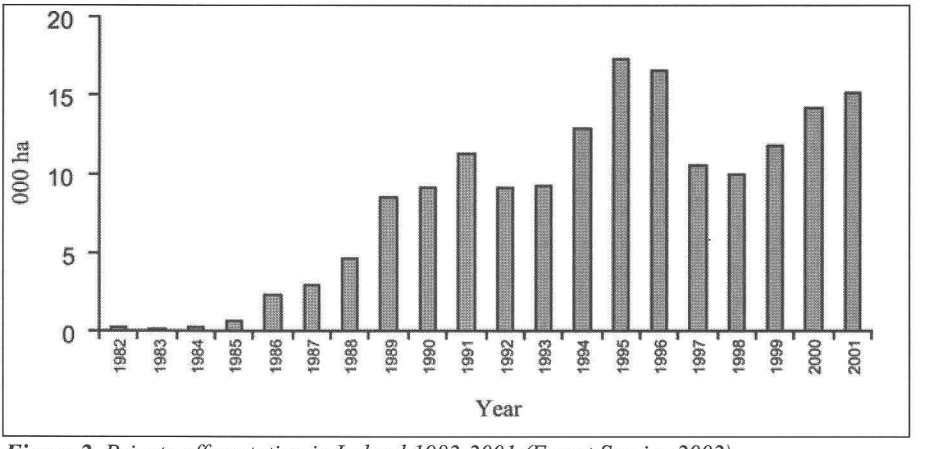

Figure 2. *Private afforestation in Ireland 1982-2001 (Forest Service 2002).*

assumed that the proportion of farmers in private planting steadily increased from 20 to 45 percent.[4]

In the analysis, Ireland was divided into five regions[5] to capture geographical differences, as well as the differences in agricultural production systems between regions. The division follows the categorisation commonly used by the Irish Central Statistics Office (CSO).

The following assumptions were made in the model:

1. most of the planting is of Sitka spruce, which is assumed to grow at yield class 20 m^3 ha^{-1} yr^{-1} (maximum mean annual commercial wood volume production) over a 40-year rotation (used as a reference for discounting),
2. uniform yields from forestry exist across regions
3. the farmer's discount rate is 5%
4. the farmer is a profit maximiser
5. the farmer qualifies for all CAP payments
6. the farmer can earn a minimum wage from an off-farm job.

Current afforestation rates across regions were modelled as a function of a 'returns ratio', which captures the ratio of forestry returns to agricultural returns. It is defined later in the paper. The relationship between the two variables is hypothesised to be positive. An increase in the returns ratio, which is brought about either by an increase in returns from forestry or/and by a decline in agricultural returns, is expected to lead to higher planting rates. It is also likely that the current planting rates of producers are affected by past rates. Producers are likely to be

[4] This issue was discussed through private communication with Professor Des Gillmor at Trinity College Dublin. Rates for 1987, 1988 and 1989 are assumed to be 30, 40 and 45% respectively.

[5] The regions are: the mid-east, the north-west, the west, the south-west and the south-east. The counties in each region are summarised in Table A.1 of the Appendix to the paper.

variable costs. Revenues included both the market revenue and total subsidies provided under both national agricultural policy and the CAP. Costs comprised costs of production, as well as the opportunity cost of labour. The opportunity cost was included to account for the fact that forestry is less labour intensive than farming, and allows for an additional income from off-farm employment. The opportunity cost was calculated by applying the minimum wage rate per hour to the hours spent in farming in excess of those needed for forestry. [6]

The DAR variables were also regionally adjusted. The adjustment was made for both extensification and headage payments. This was done according to the proportion of the national amount of these payments allocatable to each region. For instance, the greatest proportion of extensification payments have been allocated to the western regions of the country, where the average stocking density is below the national average, thus entitling the region to a larger share of the national payment. These regions have also been the main recipients of headage payments, since a higher proportion qualifies as disadvantaged. Both livestock densities and cereal yields were allowed to vary regionally.

Finally, a regional adjustment was also made in the calculation of REPS payments. The adjustment was based on the proportion each region represented of national REPS payments. The greatest participation in REPS was recorded in western regions of the country, and this is reflected in the adjustment.

Results

Returns ratio

The time series for the different regional returns ratios is presented in Figure 3. The key factors that affected the returns variable were the forestry premium, timber prices

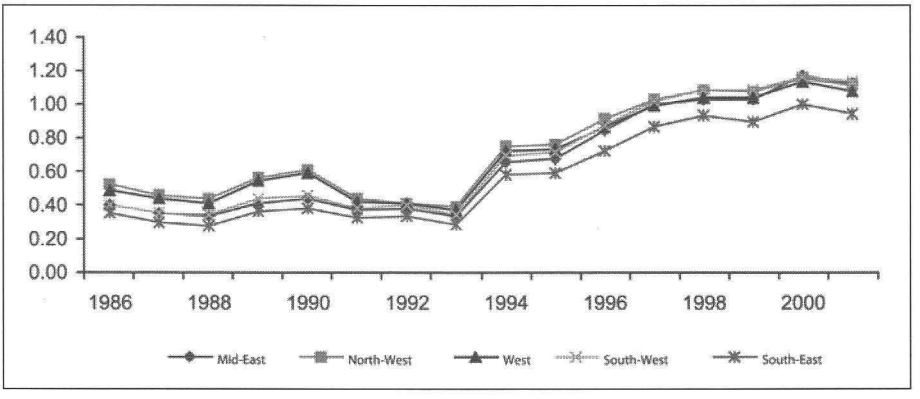

***Figure 3**. Returns ratio between forestry and competing enterprises for five regions over the period 1986-2001 (a value greater than 1 indicates forestry is more favourable).*

[6] The amount of hours deemed necessary was taken from the Teagasc Management Data for Farm Planning (1997).

and the adult cattle price. For instance, a 10% increase in adult cattle value can lead to up to a 12% decline in the returns ratio, ceteris paribus. On the other hand, an increase in the forestry premium of 10% can lead to a 7% increase in the returns ratio.

The first increase in the returns ratio for all regions was in 1989, when the forestry premium was introduced and cattle prices declined after several years of an upward trend. The ratio declined in the period 1991-1993 due to an increase in cattle prices at that time. This outweighed the 16% increase in the forestry premium introduced in 1992. In 1994, a 155% increase in the forestry premium led to a sharp upward shift in the returns ratio. The occurrence of BSE resulted in cattle price declines over the period 1994-1998, which were reflected in the steady increase in the returns ratio during this period. The post-BSE recovery of the cattle price, led to a decline in the returns ratio, despite efforts to maintain the competitiveness of forestry through the 1998 increase in the forestry premium. Following the second BSE scare in 2000 and a further increase in the forestry premium, forestry regained its competitiveness in 2000, which is again reflected in the higher returns ratio.

Afforestation level and returns ratio equation

The relationship between the afforestation levels across regions and the associated returns ratio as specified by equation (1) was econometrically estimated. The estimates of the intercept and slope coefficients (as and bs) were obtained using a fixed effects panel data estimation technique. Panel data analysis was used to avoid small sample size bias, which would arise with the single equation Ordinary Least Square estimation procedure. Panel estimation utilizes the information from the entire data set, which comprises of five cross-section elements (regions), each with 15 observations. The region-specific characteristics in terms of land quality and the prevalent production systems were accounted for by the use of a fixed effects panel data estimation technique. Hence, regional dummies for the intercept term are included in the estimation.

Table 3. *Estimated values of the coefficients of the afforestation level equation1 and their corresponding significance levels.*

Coefficient	*Estimate*	*Probability > t*
α	*-0.10*	*-0.390*
d1	*0.13****	*0.000*
d2	*0.37****	*0.000*
d3	*0.52****	*0.000*
d4	*0.31****	*0.000*
$\beta 1$	*0.57****	*0.000*
$\beta 2$	*0.83****	*0.000*

**** coefficient significant p ≤0.01 level*

[1] Total sum of squares 77.04; number of observations 75 (15x5); standard error (σ) 0.51; variance ($\sigma 2$) 0.25; residual sum of squares 17.30 (R^2 0.78).

affected by their previous planting experiences. This effect is modelled by including a lagged dependent variable in the model. All other factors that affect afforestation levels and that are not accounted for by the explanatory variables are captured in the residual term. The model was specified as a following panel data model for the five regions:

$$y_{i,t} = \alpha_i + \beta_1 y_{i,t-1} + \beta_2 x_{i,t} + \varepsilon_t \quad (1)$$

where,

y – dependant variable: afforestation level (000 ha)

i – one of five regions observed across Ireland

t – time period from sample covering 1986-2001

x – explanatory variable: returns ratio

ε - residual.

The specification of the model was such that it allowed for the intercept to be region-specific. This ensured that geographical, as well as the production differences across regions were accounted for.

The returns ratio (RR) was constructed to capture the competition between forestry and agricultural returns. It was calculated for each region i and time period t, as the ratio of discounted forestry return (DFR) per hectare to discounted agricultural return (DAR) per hectare, plus REPS payments per hectare:

$$RR_{i,t} = \frac{DFR_{i,t}/ha}{DAR_{i,t}/ha + REPS_{i,t}/ha} \quad (2)$$

The DFR variable was calculated as all revenues that arise from forestry over the rotation period minus costs, discounted at 5% rate. The revenues included premiums, revenue from thinnings and clearfelling. Thinning and clearfelling revenue were determined by applying a timber price index (McCarthy 2002) based on 2000 values to the rest of the sample period. Costs included maintenance and were estimated by applying the 2000 consumer price index (CPI) to the rest of the sample period. All other costs (plants, fencing, vegetation control, fertiliser, planting, ground preparation) were assumed to be covered by the forestry grant and were excluded from the calculations, since they cancelled each other out. Due to a lack of data on regional differences in yield across regions no adjustment was made for this factor in the model

The DAR variable was calculated as a weighted average of the discounted returns per hectare for dairy, cereal, suckler, other cattle and sheep enterprises. The areas under each enterprise were used as weights. In the case of livestock, the area was divided among enterprises according to the proportion each enterprise constituted in the national herd. This was determined by dividing the size of the herd/flock in question by the total national herd and flock. For this calculation both the national herd and the sheep flock were expressed in livestock units.

Each agricultural return was calculated as the difference between revenues and

The estimation results are presented in Table 3.

As hypothesised, the coefficients for both explanatory variables were positive and statistically significant at the $p \leq 0.01$ level. An increase in the returns ratio is estimated to have a positive effect on the up-take of farm forestry. In fact, the elasticity of planting, as derived from the estimated coefficient, suggests that a 1% increase in returns ratio increases the afforestation rate by 0.4%. Although the intercept was statistically insignificant, the differences across regions in terms of land quality and agricultural production were significant (d1, d2, d3 and d4). Overall, the results suggest that 78% of the variation in the afforestation rate is explained by the variations in the returns ratio and past planting rates (denoted as $y_{i,t-1}$ in equation 1).

In the next step, the equation of estimate (1) was used to generate projections of afforestation across regions. The coefficient $\beta 2$ was applied to the future values of the returns ratio variable to generate projections of on-farm afforestation levels. All the information necessary for the calculation of the future values of the returns ratio variable was supplied by the FAPRI-Ireland model, which projects values for all of the agricultural variables used. Two sets of results – the baseline and a scenario result are presented.

Baseline afforestation projections

First, the projections of afforestation rates were generated assuming that current forestry and agricultural policy will remain constant over the projection period 2001-2010. Therefore, the forestry premium, as well as all agricultural subsidies, is expected to remain in the same form and at the same level for the coming years.

It is expected that afforestation rates will decline in the short run. This is due to the recovery of the beef sector from the second BSE crises experienced in 2000. Beef prices are expected to increase in the early part of the projection period, which will increase the relative profitability of the sector. Given the importance of the cattle sector in Irish agriculture, such developments will improve the overall returns from agriculture and negatively affect the returns ratio. Furthermore, the incentives to extensify agricultural practice increased under the 1999 Agenda 2000 CAP reforms are expected to act as an additional deterrent to farm forestry. In order to comply with the required livestock density limits and qualify for the extensification premium, farmers are expected to either reduce their herd size and/or increase the land area going to livestock production.

However, in the long run, on-farm forestry is expected to increase its competitiveness relative to farming. Beef prices, driven by the underlying trend of falling beef consumption, are expected to return to a long-term downward path. As a result, it is expected that in the second part of the projection period, afforestation rates will increase to approximately 13,000 ha per annum. However, this increase in afforestation by the end of the decade is not expected to reach the 2001 planting rate high. The projection of 13,000 ha per annum is also 7,000 ha below the target set by the national strategic plan.

The projections of farm forestry planting rates would increase, however, if the assumption governing the opportunity cost of labour were amended to include the

average industrial wage as opposed to *the minimum wage* in the returns ratio. In this case, the opportunity cost of labour associated with farming would increase, which would improve the relative position of forestry compared to agriculture, and consequently lead to greater than originally projected afforestation levels.

Scenario projections

The baseline projections for farmer afforestation are presented in Figure 4.

Under the Agenda 2000 CAP reform, two extensification limits were introduced to influence the level and type of EU beef production. The basic concept behind extensification is to provide incentives for beef producers to hold fewer animals per hectare of land. Producers are compensated for the loss of receipts from these animals by the introduction of extensification payments, which are on a per animal basis. The payments introduced under the extensification scheme are conditional on the adherence of the producer to two different stocking density limits. In an Irish case, producers have the option to stock their farms at either less than 1.4 livestock unit (LU)/ha, or between 1.4 and 1.8 LU/ha. The lower the stocking density rate the higher the payment.

Under a scenario performed on the FAPRI-Ireland model (see Binfield et al. (2002) for more details), the two extensification limits of 1.4 and 1.8 LU/ha were reduced by 0.2 LU. Thus, the new limits for receipt of extensification payments were a stocking density level between 1.2 and 1.6 LU/ha and a stocking density of less than 1.2 LU/ha. By lowering the stocking density limits and increasing the associated payments, the aim of the scenario analysis was to quantify the reduction in beef animals likely to be associated with these new limits[7]. The results suggested a reduction in non-dairy cattle numbers of 274,000 head, which is approximately 5%

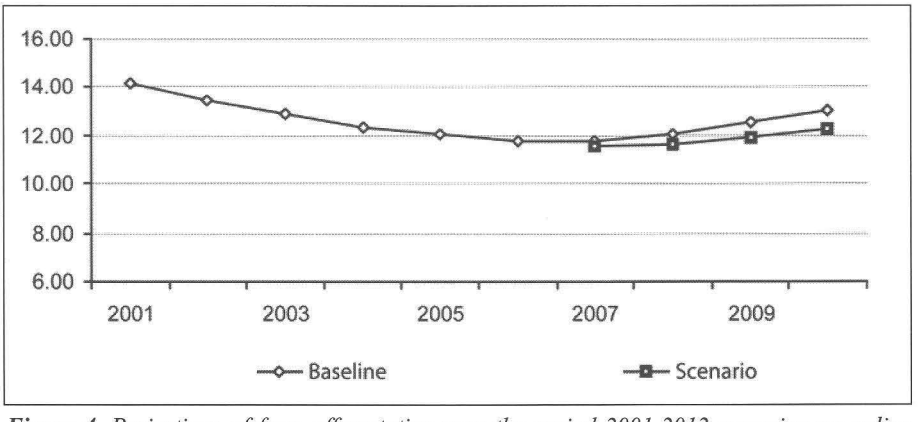

***Figure 4**. Projections of farm afforestation over the period 2001-2012 assuming no policy change (Source: FAPRI-Ireland Model).*

[7] The scenario was initially devised in February 2002 as a possible CAP Mid-Term Review policy scenario.

over the period 2000-2010. Furthermore, the reduction in sheep numbers was estimated at 15% over the projection period.

The introduction of incentives to further extensify production has an adverse effect on on-farm afforestation levels. In order to reduce livestock density to the required limit and thus qualify for the payment, farmers are expected to further increase the land area used for animal production. As a result, relative to the baseline result, less land is expected to move into farm forestry, owing to the increased competitiveness of land remaining in livestock production. The impact of such a policy scenario on afforestation levels is quantified by our model and presented as the ancillary line in Figure 4. The recovery of afforestation rates in the long run is expected to be slower than projected under the baseline, with circa additional 1,000 ha/yr remaining in agriculture.

Mid-Term Review of the CAP and decoupling of direct payments

The June 2003 medium term review (MTR) of the CAP paves the way for the decoupling of all EU direct payments from 2005 onwards.[8] Producers will no longer be obligated to produce in order to receive the decoupled payment. The payment, which is based on a historical average of direct payments received by the producer over the 2000-2002 period, is guaranteed until 2013. Under the new CAP, greater emphasis is placed on the concept of 'cross-compliance'. Previously, cross-compliance was voluntary for Member States and applied to environmental standards only. Following the MTR, cross-compliance is now compulsory. Under cross-compliance the producer will be obliged to keep any land, not in production, in good agricultural condition. Crucially, farmers will be able to claim full decoupled payment along with forestry premium as long as they do not plant more than 50% of their land.

In terms of the present model set-up this complicates matters somewhat. Producers are assumed to allocate land between forestry and traditional agriculture on the basis of the relative returns per hectare. However, the land allocation decision now has to be decomposed between (i) agricultural producers who wish to continue to produce and those engaging in forestry and (ii) agricultural producers who do not wish to produce (but still get the decoupled payment) and those engaging in forestry. In the first case the relative returns are agricultural returns plus the decoupled payment versus forestry returns, while in the second case the relative returns are just the decoupled payment versus forestry returns. First, however, the decision of agricultural producers to produce or not must be modelled.

A recent study by Wiemers and Behan (2004) suggests that decoupling could have a positive effect on farm forestry.

[8] On 19/10/03, the Irish Government announced that all direct payments for cattle, sheep and arable crops would be fully decoupled from production as and from January 1, 2005. Full details of the MTR may be accessed online at: http://europa.eu.int/comm/agriculture/mtr/memo_en.pdf.

Conclusions

This paper provides an introduction to the forestry model, which has been added to the FAPRI-Ireland model of the Irish agricultural sector. The new expanded modelling system now has the capability to quantify the implications for farmer afforestation rates of changes in both agricultural policy and markets, as well as changes in the levels of forestry premiums and grants. This is particularly important given the clear implications for farm forestry in Ireland of any changes in the CAP.

The paper proposes a panel data econometric model to investigate the factors underlying farmers' afforestation decisions. The use of a panel data approach allows the model to incorporate differences across national regions in terms of afforestation behaviour. The greater level of information afforded by a panel data approach improves the efficiency and hence the reliability of the parameter estimates obtained. This is particularly important as the model is used to generate projections of likely future patterns of farm afforestation levels.

The projections show that afforestation rates are likely to decline in the short run, as the beef sector recovers from the 2000 BSE scare and livestock production is subject to greater incentives to extensify production practices. However, in the long run, forestry is expected to regain competitiveness vis-à-vis traditional agricultural enterprises for many producers. This is expected to be reflected in greater afforestation rates towards the end of this decade. The expected speed at which afforestation converges to the levels recorded in 2001 depends greatly on the policy environment. If no change in policy is assumed for the projection period, an annual rate of afforestation in excess of 13,000 ha can be expected by 2010. Any change in the forestry grant and/or premium payment would have a significant impact on future afforestation levels. Also, however, if agricultural policy is reformed to include further incentives to extensify livestock production, as defined in our policy scenario, then afforestation rates by the end of this decade are expected to be below the baseline projections and thus, even further from the national target of 20,000 ha per annum.

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Appendix

Table A.1. *County composition of regions.*

Region				
Mid-East	***North-West***	***West***	***South-West***	***South-East***
County				
Dublin	*Longford*	*Clare*	*Cork*	*Carlow*
Kildare	*Leitrim*	*Galway*	*Kerry*	*Kilkenny*
Laois	*Sligo*	*Mayo*	*Limerick*	*Wexford*
Louth	*Cavan*	*Roscommon*		*Wicklow*
Meath	*Donegal*			*Tipperary*
Offaly	*Monaghan*			*Waterford*
Westmeath				