The Rural Economy Research Centre

Working Paper Series

Working Paper 09-WP-RE-01

The 2003 CAP reform: Do decoupled payments affect agricultural production?

Peter Howley*, Kevin Hanrahan and Trevor Donnellan

Rural Economy Research Centre, Teagasc, Athenry

For More Information on the RERC Working Paper Series
Email: Cathal.odonoghue@teagasc.ie,
Web: www.tnet.teagasc.ie/rerc/

The 2003 CAP reform: Do decoupled payments affect agricultural production?

Peter Howley*, Kevin Hanrahan and Trevor Donnellan

Abstract

The move from coupled payment policy instruments to payments that are decoupled from production have made estimating future trends in agricultural output much more challenging. Using a dynamic multi product partial equilibrium model, the overall aim of this paper is to examine the potential supply inducing effect of decoupled payments. This issue is important in the context of WTO negotiations, and, in particular, in discussions surrounding the appropriateness of decoupled payments being included as a 'green box' policy. The results suggest that farm operators, to a large extent, do not treat these payments as fully decoupled and they do in fact maintain a strong supply inducing effect on agricultural production. Findings suggest, however, that this trade distorting effect is less than previously coupled payments.

Keywords: decoupled payments, WTO green box, agricultural production

Peter Howley: peter.howley@teagasc.ie

The 2003 CAP reform: Do decoupled payments affect agricultural production?

Introduction

European agricultural policy underwent significant changes under the Mid-Term Review of the Common Agricultural Policy (CAP) in 2003. World Trade Organisation (WTO) concerns were central to shaping the 2003 reforms where with some exceptions, member states agreed to implement a system of single farm payments (SFP) which were decoupled from production. This shift towards decoupled payments was introduced in order to reduce the trade-distorting and inefficiency effects of the CAP (Swinbank and Daugbjerg, 2006). Policy changes such as the shift towards decoupled payments not only have significant effects on agriculture but also rural areas and society more generally (Burrell, 2004; Moreddu et al, 2004; Boel, 2006). Increasingly, farmers can be viewed as multifunctional providers of a range of commodity and non-commodity goods that are valued by society (Kantelhardt, 2006) as for instance, in addition to providing us with food and other raw materials necessary for our survival and maintaining economic activity in rural areas (Kelch and Normile, 2004), farming activity has environmental (Firbank, 2005; Cocklin et al, 2006), aesthetic (Vanslembrouck et al, 2005) and social functions (Gerowitt et al, 2003). In effect, farm activity can be seen as influencing the provision of a variety of public goods (Randall, 2002; Vatn, 2002).

Decoupled payments was defined in the Uruguay Round Agreements Act (URAA) as payments that are financed by taxpayers rather than by consumers, are not related to current production, factor use or prices and for which the eligibility criteria are defined by a fixed historical base period, whereby actual production is not needed to receive payments. Decoupled payments are in the World Trade Organisations (WTO) ‘green box’ of agriculture related subsidies and thus must adhere to the fundamental requirement that the policy has no, or at most minimal, trade-distorting effects. Advocates of decoupled payments assert that breaking the link between subsidies and production removes the incentive for farmers to maximise production, effectively freeing farmers to produce what the market and consumers want. That said, whether decoupled payments have a significant effect on the production behaviour of farmers has generated considerable international debate.

Given the significant and wide-ranging effects of farming activity on the agricultural sector and on society more generally, and the budgetary resources devoted to agriculture within the EU, it is important that the effect of policy changes on agricultural activity be assessed. In this regard, using a dynamic, multi product, partial equilibrium model (Agmemod[1]) of the EU agricultural sector, the overall aim of this paper is to examine the potential impact of the recent policy shift towards decoupled payments on the behaviour of farm operators. Ireland is a useful case study to examine this issue as since 2005 Ireland has chosen to decouple all direct payments. The partial equilibrium model utilised in this analysis provides projections of various agricultural commodities between 2005 and 2020 under a variety of different assumptions relating to the supply inducing impact of decoupled direct income payments. More specifically, projections relating to the cereal and cattle sectors were made under two different assumptions concerning the supply inducing impact of “production decoupled” direct payments. In the first reference scenario run of the model it is assumed that decoupled payments have no impact on farmers production decisions, i.e. that they are truly decoupled. Providing projections relating to the level of actual output that should be observed if decoupled payments are in fact non-trade distorting will help inform on the feasibility of claims that they fulfil the 'green box' requirement of none, or at most, a minimal trade distorting impact. In the second run of the model it is assumed that decoupled payments have a supply inducing impact equivalent to the coupled payment instruments that were in place prior to the 2003 CAP Reform, i.e. that they are in effect still fully coupled. The projections under the two model runs are then compared with the observed market outcomes in Ireland (CSO, 2008) since the introduction of decoupled direct income payments in 2005. Comparing levels of production that are projected under the alternate assumptions of full and zero coupling with actual observed values will provide some guidance as to the actual effect of decoupled payments on the agricultural sector.

The effect of decoupled payments on production

The European Commission has declared that decoupled payments fall under the World Trade Organisations (WTO) category of 'green box' subsidies that result in none, or at most, minimal trade distortions of agricultural markets. However, there is considerable uncertainty as to whether these payments are indeed production neutral. In a European context, empirical research examining the effect of decoupled payments on agricultural production has, to date, been limited. This is because the recent reform represents such a new and radical policy shift that no previous experience exists with its application and, in addition, its application in the EU has been gradual. One study which did examine this issue was by Hennessy and Thorne (2005) in which survey data on farmers production plans post decoupling were compared to outputs predicted by a farm-level profit maximisation model. Here it was shown that a significant number of farmers plan to use their decoupled payments to continue or expand non-viable production. Similarly in a study of the UK dairy sector, Colman and Harvey (2005) demonstrate that many farmers are determined to remain in farming despite low returns. They report that given the stated commitment of a majority of dairy producers to continue and even expand production, it seems likely that they will treat their direct payments as coupled in order to achieve their ambitions. In effect Colman and Harvey (2005) expect that farmers will use the new decoupled payments to help bridge the gap between low market prices and higher costs of production. Furthermore, it is important to note that cross compliance obligations can have the effect of at least partially recoupling decoupled payments. Through cross-compliance obligations farmers are required to maintain their land in good agricultural and environmental condition in order to receive their full payment. This is likely to result in some compliance costs and may make it optimal for some farmers to keep land in agricultural use where without this requirement it would otherwise be left idle or converted to non-agricultural use.

In the U.S, similarly to Europe, there has also been a significant move towards payments that are decoupled from production in order to improve the market orientation of the agricultural sector. The 1996 farm Act replaced the target price/deficiency payment program with production flexibility contract (PFC) payments that are not related to current levels of production or market prices. These payments were introduced as a way to maintain income transfers to farmers while minimising distortions on production. Similarly to the European example, however, many commentators question whether these payments are treated by farm operators as being truly decoupled. Tielu and Roberts (1998) and Hennessy (1998), for instance, contend that PFC payments do still distort trade by increasing a farm operators overall wealth. The argument here is that with increased income from these decoupled payments, farmers can more easily invest in their farm operation thus increasing production. Furthermore, farmers with higher guaranteed incomes are more likely to be granted loans from lenders and this increase in loan availability may also facilitate agricultural production. One additional reported potential impact of PFC payments is that the increase in wealth accruing from decoupled payments may decrease a farmers risk aversion, consequently making farmers more likely to engage in certain production activities that otherwise they may not have made.

The evidence as to whether PFC payments have an effect on production is somewhat mixed. A study for the USDA conducted by Burfisher and Hopkins (2003) concluded that decoupled payments had no impact on production whereas those by Young and Westcott (2000), Adams et al. (2001) and Goodwin and Mishra (2005) suggest that PFC payments have an effect although a relatively modest one on production. Key et al. (2005) found much more significant effects on production with participants in PFC programs found to an average increase plantings of crops by 38-59 per cent more than non PFC participants.

The actual trade distorting effect of decoupled payments is likely to differ across countries and even regions depending on the characteristics of the farm operator and farm system and expectations relating to future payments. For example, relatively older farmers are much less likely to allocate direct payments for on-farm purposes (Goodwin and Mishra, 2005) and wealthy farm operators are more likely to use decoupled payments for on farm investments (Goodwin and Mishra, 2005; Young and Westcott, 2000). In addition, some farmers may only make minimal changes to production in case future payments are reassessed and again related to production. This is likely to be a more significant issue in countries where they are frequent changes in farm policy.

Research Design

The modelling approach used in this analysis was the development of an econometric, dynamic, multi-product, partial equilibrium model. Twenty three teams, from EU Member States, have built country level models that reflect the specific situation of the agricultural sectors in their individual country[2]. The maintenance of analytical consistency is achieved via adherence to a common model template across all the partners involved in the model. In all country models, agricultural supply and use data as well as policy data for the years 1973-2005 have been collected. The CAP budget and national ceilings remain at the levels set out in Regulation EC 1782/2003. For each commodity modelled, and in each country, agricultural production as well as supply, demand, trade, stocks and domestic prices are derived by econometrically estimated equations. The national level models have been combined into a composite EU model. Each country model contains the behavioural responses of economic agents to changes in prices, policy instruments and other exogenous variables. One element of the supply and demand balance (usually exports), for each commodity modelled, is derived as a closure variable to ensure that the supply and use identity holds for all EU markets throughout the projection period. This condition implies that production plus beginning stocks plus imports will always equal domestic use plus ending stocks plus exports. In order to take account of the influence of other member states on a given country market, when the national level market is not considered as the key market in the EU, the internal price is determined as a function of the chosen key price for the EU and the self sufficiency rate for the national market and the self sufficiency rate for the key market.

Projections of exogenous data relating to macroeconomic series such as exchange rates and GDP taken from research institutions within each individual Member State have been incorporated into the model. In addition, projections of world prices from the Food and Agricultural Policy Research Institute (FAPRI) have been incorporated into the model structure. The development of specific country models has allowed for the capture of the inherent heterogeneity of agricultural systems existing within the EU, while simultaneously maintaining analytical consistency across the estimated country models. Within this combined model environment all EU prices, as well as all elements of agricultural commodity supply and demand in each member state, are modelled endogenously. Hence, the final dynamic, multi-market, multi-country, composite model developed, allows us to generate projections for each Member State, under the assumption of exogenous world prices. What follows is a description in general terms of the functional specification of the econometrically estimated equations relating to the commodities of relevance for this analysis, namely the crops and livestock sectors.

In relation to crops it is assumed that land allocation is made in a two-step process. In the first stage of the process producers are modelled as determining the total land area allocated to grains, oilseeds and root crop culture groups (i). Then, in a second stage, the shares of the land areas allocated to the grains, oilseeds, and root crop cultures are allocated to each culture j belonging to the corresponding culture group (i).

The total area harvested equations for grains, oilseeds and root crops can be written as

$$ah_{i,t} = f\left(p^{j}_{i,t-1}, ah_{l,t-1}, V\right) \qquad j = 1,\ldots,n; \quad i,l = 1,\ldots,3; \quad i \neq l \qquad (1)$$

where $ah_{i,t}$ is the area harvested in year t for culture group i, $p^{j}_{i,t-1}$ the real price in year $t-1$ of culture j belonging to the culture group i, and V is a vector of exogenous variables such as various policy instruments (e.g. the set aside rate and the rate of arable aid compensation) which could have an impact on the area of culture i harvested.

The equations used to determine the share of culture k belonging to culture group i ($sh^{k}_{i,t}$) can be written as $sh^{k}_{i,t} = f\left(p^{j}_{i,t-1}, sh^{k}_{i,t-1}\right) \qquad j, k = 1,\ldots,n$. (2)

The yield equations of culture k in culture group i can be written as

$$r^{k}_{i,t} = f\left(p^{j}_{i,t-1}, r^{k}_{i,t-1}, V\right) \qquad j, k = 1,\ldots,n \qquad (3)$$

where $r^{k}_{i,t}$ is the yield per hectare of culture k belonging to the culture group i, and V a vector of variables, which could have an impact on the yield per hectare of the culture being modelled.

In the specification of the crops sub-models' supply side, income per hectare is not considered in the functional forms. This choice was made in order to distinguish the price and policy variables separate effects on producers' supply decisions. On the demand side, crush and feed demand and non-feed use per capita are modelled using the following general functional forms:

$$Fu_{i,t}^{k} = f\left(p_{i,t}^{j}, Z\right) \qquad j,k = 1,...,n \qquad (4)$$

where $Fu_{i,t}^{k}$ is the feed demand for culture k belonging to the culture group i and Z a vector of endogenous variables, which could have an impact on the demand considered (e.g. meat production).

$$NFu_{i,t}^{k} = f\left(p_{i,t}^{j}, NFu_{i,t-1}^{k}\right) \qquad j,k = 1,...,n \qquad (5)$$

where $NFu_{i,t}^{k}$ is the non-feed demand for culture k belonging to the culture group i. Crush demand for oilseed culture k ($CR_{i,t}^{k}$) is modelled as

$$CR_{i,t}^{k} = f\left(p_{i,t-1}^{h}, p_{i,t-1}^{h}, p_{i,t-1}^{l}, CR_{i,t-1}^{h}\right) \qquad h, l = 1,...,n \qquad (6)$$

where $p_{i,t-1}^{h}$ the real price of considered seed oil and $p_{i,t-1}^{l}$ the real price of the seed meal produced as a product of the crushing process.

The stock level, exports and imports equations for the grain and oilseed models in general have the following functional forms

$$St_{i,t}^{k} = f\left(PR_{i,t}^{k}, DU_{i,t}^{k}, St_{i,t-1}^{k}\right) \qquad (7)$$

$$Ex_{i,t}^{k} = f\left(PR_{i,t}^{k}, DU_{i,t}^{k}, Ex_{i,t-1}^{k}\right) \tag{8}$$

$$\mathrm{Im}_{i,t}^{k} = f\left(PR_{i,t}^{k}, DU_{i,t}^{k}, \mathrm{Im}_{i,t-1}^{k}\right) \tag{9}$$

where $\mathrm{Im}_{i,t}^{k}$, $Ex_{i,t}^{k}$ and $St_{i,t}^{k}$ are respectively the ending stocks, exports and imports for culture k belonging to the culture group i in year t, $PR_{i,t}^{k}$ and $DU_{i,t}^{k}$ are the production and the total domestic use of culture k belonging to the culture group i.

While the structure of individual livestock and meat sub-models varies, their general structure is similar and is presented below. The most important equation of relevance for the livestock sectors and associated meat products is the ending numbers of breeding animals (e.g. suckler cows for beef) and this can be written as

$$cct_{i,t} = f\left(cct_{i,t-1}\, p_{i,t}, V\right) \qquad i = 1,\ldots,n \tag{10}$$

where $cct_{i,t}$ is the ending number in year t for the breeding animal type i, $p_{i,t-1}$ is the real price in year $t-1$ of the animal i considered, and V is a vector of exogenous variables such as policy instruments (e.g. the direct payment linked to the animals concerned or specific national policy instruments) which could have an impact on the ending inventory concerned.

Numbers of animals produced by the breeding herd inventory can be written as

$$spr_{i,t} = f\left(cct_{i,t-1},\ ypa_{i,t}\right) \qquad i = 1,\ldots,n \tag{11}$$

where $spr_{i,t}$ is the number of animals produced from breeding herd $cct_{i,t}$ in year t and $ypa_{i,t}$ is the exogenous yield per breeding animal concerned.

Within each animal culture i there may be m categories of slaughter j. The number of animals in animal culture i that are slaughtered in slaughter category j can be written as

$$ktt_{i,t}^{j} = f\left(cct_{i,t}^{j}, p_{i,t}, z_{i,t}^{j}, V\right) \qquad i = 1,...,n \qquad j = 1,...,m \qquad (12)$$

where $ktt_{i,t}^{j}$ is the number of animals slaughtered in category j of animal culture i in year t, $z_{i,t}^{j}$ is an endogenous variable that represents the share of different categories of animals slaughtered in the total number of animals slaughtered for the animal culture concerned, and V is a vector of exogenous variables. Average slaughter weight in animal culture i can be written as

$$slw_{i,t} = f\left(slw_{i,t-1}, z_{i,t}^{j}, p_{i,t}, V\right) \qquad i = 1,...,n. \qquad j = 1,...,m. \qquad (13)$$

Total meat production from animal culture i is then derived as the product of average slaughter weight times total slaughter in that culture, which is defined as

$$ktt_{i,t} = \sum_{j} ktt_{i,t}^{j} \qquad i = 1,...,n. \qquad j = 1,...,m. \qquad (14)$$

Ending stocks of animals (breeding and non-breeding), and meat production are derived using identities. Total domestic use of meats is derived as the product of per capita demand for the meat concerned times an exogenous population variable. Per capita consumption of meat can be written as

$$upc_{i,t} = f\left(upc_{i,t-1}, p_{i,t}, p_{k,t}, gdpc_t, V\right) \qquad k, i = 1,\dots,n; \;\; k \neq i. \qquad (15)$$

where $upc_{i,t}$ is the per capita consumption of meat i in year t, $gdpc_t$ is the exogenously determined per capita real income and V is a vector of other exogenous variables that have an impact on per capita meat consumption. The functional form used to estimate the ending stocks of meats has the same general form as that used in the estimation of the animal breeding inventories, equation (10). Similarly the specifications of the trade equations for animals and meats follow the same general functional form used in the grain and oilseed models, equations (7)-(9) (for more details relating to the model structure the reader is referred to Chantreuil et al., 2005).

In order to analyse the impact of policy reform, data on all of the different types of direct payments that are and were part of the CAP, were collected for each member state. This was used to create a database which in a coherent manner across all the member states incorporated the total budgetary envelopes, the different types of the EU CAP direct support elements, and their allocation from the total budgetary envelopes. The degree to which decoupled payments are expected to impact production decisions is captured via explicit coefficients that are termed multipliers. Using these multipliers and the various policy data a set of country specific variables were developed which calculated the impact of policy instruments on the supply and use of various agricultural commodities. In particular, in the case of Ireland an adjusted gross return figure for grains and a reaction price for beef were calculated.

These variables were then included in the estimated equations in the model. Thus the model structure allows projections of agricultural production under different assumptions relating to the supply inducing impact of decoupled payments. For example, in the case of cattle it is assumed that the incentive price faced by farmers is the real cattle or beef price plus the beef reaction price. The reaction price varies according to the degree to which the decoupled payments of relevance to the cattle sector are assumed to have a supply inducing effect. Setting the multipliers as equal to 1 assumes that decoupled payments have the same supply inducing impact as previously coupled payments and setting the multiplier as equal to zero assumes that decoupled payments do not have any effect on agricultural production. In the case where decoupled payments are assumed to be production neutral the reaction prices and the adjusted gross return figures are zero and the incentive price faced by farmers is simply the market price.

Results

Two of the main coupled support measures of relevance in Ireland prior to the decoupling of direct payments in 2005 were cattle payments (Suckler Cow, Special Beef and Extensification Premiums) and an arable aid scheme for cereals. Cattle payments were increased since the CAP reforms of 1992 to compensate farmers for falls in market support. Payments were based on the utilised agricultural area of each farm and were directly linked to animal numbers (although subject to a relatively generous stocking limit). As with cattle payments, the arable aid scheme was introduced to compensate farmers for reductions in prices accruing from the CAP reforms of 1992 and payments were also linked to production. Initially payments were conditional on eligible land which meant that the area under cereals effectively could not be increased beyond the 'base area'. Since 1996, transfer of eligibility rules allowed farmers to plough up and re-sow areas previously ineligible under the Arable Aid Scheme and convert these to intensive cereal production. In 2005, Ireland chose to implement a system of single farm payments (SFP) which were fully decoupled from production. What follows below is an analysis of the extent to which different assumptions regarding the supply inducing impacts of decoupled payments can affect agricultural production. In particular, projections for the level of grain and beef production under the assumptions of full (decoupled payments have the same impact as previous coupled payments) and zero coupling (decoupled payments have no impact on production) are given for the period 2005 to 2020. This is followed with a comparison of model projections with observed data between 2005 and 2008 which it is hoped will provide some guidance as to the actual supply inducing impact of decoupled payments.

In relation to grains, there are projected price increases in the prices of the three major grains in Ireland namely soft wheat, barley and oats between 2005 and 2020 which is largely driven by projected increases in biofuel demand in the EU. Despite this increase in price, under the first scenario run when decoupled payments are assumed to have no supply inducing impact, overall grain area harvested is projected to decrease by 11 percent (see table 1). Under the second scenario run when decoupled payments are assumed to have the same effect as previous coupled payments, the level of cereal area harvested is projected to increase by 34 per cent. There is a projected strong growth in the yields of soft wheat, barley and oats over the projection period which coupled with the increase in overall grain area harvested results in the production of grains being projected to increase under both scenarios over the projection period. It should be noted, however, that the stronger increase in the area harvested when decoupled payments are assumed to have the same effect as coupled payments results in crop acreage being farmed less intensively with the result of slightly lower yields. Assuming decoupled payments do not have an effect on farm behaviour it is projected that overall grain production will increase by 10 per cent with the increase being 56 per cent if decoupled payments have the same effect as coupled payments. The significant differences in the levels of production under these two different scenarios results in very different figures in relation to trade. At the start of the projection period Ireland was a net importer of grains to the tune of 717,000 tonnes. Assuming decoupled payments are production neutral results in Ireland being projected to remain as a net importer of grains although at a lower level of 316,000 tonnes. The significant change in the production of grains under the assumption that decoupled payments have a similar supply inducing impact as coupled payments results in Ireland being projected to become a net exporter of grains to the level of 578,000 tonnes at the end of the projection period.

Despite projected increases in nominal cattle prices, under the assumption that decoupled payments are production neutral, the number of suckler cows are projected to decrease by 31 per cent over the projection period. This projected contraction contrasts with the evolution of the suckler cow herd in the years prior to the introduction of decoupled payments. For instance, the number of suckler cows increased by 58 per cent between 1990 and 2005 in response to the introduction of coupled direct payments. There is a projected decline in the real returns to cattle farming mainly due to rising feed prices brought about by projected increases in the price of grains. This means that even if decoupled payments are assumed to have the same effect on production as previous coupled payments then the number of suckler cows is still projected to decline over the projection period, although to a much smaller extent (20 per cent). Under both scenarios, the dairy cow herd is projected to decline by 13 percent over the projection period. This decrease is due to an increase in milk yields as the milk quota is fixed at 2008/2009 levels for this analysis. The decline in the number of suckler and dairy cows coupled with a sight decrease in average cattle slaughter weights, as a result of higher grain prices, results in a projected decrease of 33 per cent in beef production under the zero coupling assumption as compared to a figure of 23 per cent under the assumption that these payments have the same supply inducing impact as coupled measures.

It can be seen from the analysis of the grain and cattle sectors that the extent to which these payments are treated as decoupled by farmers will play an important part in influencing agricultural production. Any impacts on domestic production can, in turn, be partially transmitted to world markets through increased exports and lower prices. Furthermore, the results above suggest that the degree to which decoupled payments affect production will have a differential effect across different farming systems depending on the respective supply elasticity's. As illustrated in table 1, farmers involved in the production of grains are much more responsive to different assumptions relating to the supply inducing effect of decoupled payments than cattle farmers. This is due to the relative impact of support measures on cattle and cereal farmers' production decisions. Cattle rearing in Ireland is less labour intensive than grain production and there is a much greater proportion of what can be called part-time lifestyle or hobby farms in this sector. These part-time lifestyle or hobby farmers are less responsive to market signals such as changes in the form and level of support than those in other sectors.

Insert table 1 here

Table 2 provides a comparison of actual observed market data with projections from the model under the two different assumptions relating to the supply inducing impact of decoupled payments between 2005 and 2008. Firstly, in relation to grains, under the assumption that decoupled payments have no effect on farm behaviour there is a projected 11 per cent decrease in cereal area harvested. When decoupled payments are assumed to have the same supply inducing impact as previous coupled payments there is an actual projected increase of 24 per cent in the level of grain area harvested. According to the Central Statistics Office (CSO, 2008) total grain area harvested increased by 14 per cent between 2005 and 2008. In relation to the cattle sector, under the assumption that decoupled payments are production neutral, there is a projected decline of 8 per cent in the number of suckler cows between 2005 and 2008 and a decline of 1.5 per cent under the assumption that decoupled payments maintain the same supply inducing impact as coupled payments. In terms of actual observed figures, the number of suckler cows decreased by 3 per cent between 2005 and 2008.

As can be seen in table 2, the level of grain area harvested and suckler cow numbers observed over the period 2005 to 2008 is considerably above that projected when payments are assumed to have no effect on farmers' production decisions, and is lower than the levels projected when payments are assumed to be fully coupled. Therefore it would seem that these decoupled payments maintain a strong effect on farm behaviour, albeit one that is lower than previous coupled direct payments. The analysis for cattle farmers has been complicated with the introduction of a Suckler Cow Welfare and Quality Scheme in 2008 which has had the effect of partially recoupling cattle payments. Under this scheme farmers can receive a monetary payment for each cow for 5 years (up to a maximum of 100 cows) subject to various conditions such as attending training courses aimed at helping farmers to improve herd health and to produce beef in an 'animal friendly' way. This payment has rewarded farmers for keeping suckler cows even when it was not profitable to do so.

Insert table 2 here

The extent to which decoupled payments affect production is an important question in the context of International trade as these payments can be exempt from WTO limits if they have none, or at most, a minimal effect on agricultural production. It would seem from the analysis above that decoupled payments maintain a strong supply inducing impact on production behaviour for many farm operators. In fact, the results suggest that over the short term time horizon examined here grain and cattle farmers are closer to treating their decoupled direct income payment as coupled rather than totally decoupled from production. That said, decoupling is both a new and radical shift in the CAP and it is conceivable that farmers may consider these payments as truly decoupled in time. For example, it may take some time before the breeding stock of cows can be adjusted and for farmers to realise that they are both losing money and that actual production is not needed to receive payments (Breen et al., 2008). Therefore it remains to be seen whether farmers will in fact treat decoupled payments as truly decoupled from production in the long term.

Economic theory would suggest that if coupled payments are replaced with payments that are truly decoupled from production, then production should fall to a level that would exist without any subsidies. However, in contrast to ‘homo-economicus’ strategies which assume that farmers behave absolutely rationally and only have profit-maximisation in mind, there are likely to be a variety of factors that influence the activity of farmers (Kantelhardt, 2006). Some of these potential influences include: utility derived from being self-employed, prestige associated with land ownership, family circumstances, benefits accruing from social interaction with other farmers and individuals in the agricultural sector and aversion to change. Summary statistics, for example, have shown that a substantial proportion of farmers operate at a market loss (see Hoppe and Banker, 2006; Breen et al., 2008) which would suggest that there are a variety of non-pecuniary benefits to farming. Key and Roberts (2008) and Key (2005) describe how attributes associated with farming such as independence and pride associated with business ownership are valuable to farmers and these attributes may not be observable in other types of employment. Outside of agriculture it has been widely reported that the self employed, all things being equal, report much greater levels of satisfaction with their jobs (Hamilton, 2000). The variety of non-market based benefits to farming mean that decoupled payments could potentially alter the supply of agricultural commodities by allowing those who enjoy farming irrespective of any financial reward to continue in farming. One particular problem with land use models is that often they assume farmers act to maximise wealth or profit and the variety of non-economic motivations that act as an incentive to continue in production are ignored. As Hennessy (2004) notes, farmers engage in production for economic as well as non-economic motivations and there is a need for verifiable empirical data in relation to the many non-economic factors that influence farm behaviour.

Conclusion

Traditionally, direct payments in Europe and elsewhere have linked payments to production. This has had the effect of substantially altering the market for particular agricultural commodities as farmers could receive more payments simply by producing more of the supported commodity irrespective of any consumer needs (Ackrill, 2008; Swinbank and Daugbjerg, 2006). In addition to a large budgetary cost, the policy of price support in the EU created significant tensions between the EU and other agricultural exporters. As a result, the EU since the MacSharry reforms in 1992 has sought to increase the market orientation of the agricultural sector. The biggest step in this regard was breaking the link between payments and production with the Mid-Term Review of the CAP in 2003. Under this new system, farmers are paid a lump-sum cash payment based on historical payments, whereby actual production is not needed to receive support. Decoupled payments are in the 'green box' of domestic support defined by the World Trade Organisation (WTO) and thus are assumed to have none, or at most, minimal trade distorting effects. Decoupled payments have, however, generated considerable international debate as to whether they do in fact alter the behaviour of farm operators. While decoupled payments do not distort market price signals, they do increase a farm operators wealth and this is argued by many will alter production behaviour (Adams et al., 2001). Additionally, many commentators assert that farmers often do not respond in a profit-maximising manner and are determined to stay in farming despite low returns and will often use these payments to subsidise seemingly unprofitable production (Hennessy and Thorne, 2005).

This paper provided projections for cereal and beef production between 2005 and 2020 under the alternate assumptions of full (decoupled payments have the same impact as previous coupled payments) and zero (decoupled payments have no impact on production) coupling. The results suggest that the extent to which decoupled payments are treated as coupled by farmers will have a significant effect on agricultural production. For this reason it is important to ascertain the actual effect, if any, of decoupled payments on the behaviour of farm operators. In this regard, this paper compared projections under the alternate assumptions of full and zero coupling with observed market outcomes between 2005 and 2008 which helped to provide a better understanding of the impact of decoupled payments on agricultural production. The results suggest that grain and cattle farmers (at least over the short to medium term horizon considered here) do not consider these payments as fully decoupled. It would seem that for cereal and cattle farmers decoupled payments, to a large extent, are being used to subsidise unprofitable production.

To sum up, the analysis presented in this paper highlights how important it is to determine the actual supply inducing impact of decoupled payments, as different assumptions regarding their production impacts, result in very different projected levels of agricultural production and by extension levels of trade and prices. Furthermore, arguments that as these payments are not directly linked to production they must have a negligible effect, if any, on trade are not realistic. The results presented here suggest that decoupled payments maintain a strong effect on agricultural production in many sectors, albeit one that is less than if these payments were still fully coupled. In relation to future research, it is unlikely that the supply inducing impact of decoupled payments will be the same across farming systems and future micro-econometric analysis is needed at the farm level to ascertain the differential impact of decoupled payments.

Note 1: AGMEMOD is funded under the European Commission 6th Framework and by contributions from the partners' institutes throughout the EU. The AGMEMOD Partnership model is an econometric, dynamic, multi-product partial equilibrium model and involves institutes in the EU15 group of Member States. In advance of the accession of the so-called "new" Member States in May 2004 the AG-MEMOD partnership was expanded in 2002 to include research institutes from 8 of the 10 new EU Member States.

Note 2: The French and Belgium team have built a country level model for Sweden and Luxembourg respectively. Due to problems with data availability, Cyprus and Malta have been excluded from the model.

References

Ackrill, R.W. (2008) The CAP and its reform-half a century of change? *Eurochoices*, 7(2): 13-21.

Adams, G., Westhoff, P., Willott, B. and Young, R.E. II (2001) Do 'Decoupled' Payments Affect US Crop Area? Preliminary Evidence from 1997-2000. *American Journal of Agricultural Economics* 83 (5): 1190-1195.

Boel, M.F. (2005) Delivering on the potential of the new CAP. *Eurochoices*, 4(2): 6-11.

Breen, J., Hennessy, T. and Thorne, F. (2008) Medium term outlook for the Beef, Tillage and Dairy Sectors. Available at: http://www.agresearch.teagasc.ie/rerc

Burfisher, M.E., and Hopkins, J. (Eds.) (2003) *Decoupled payments: Household income transfers in contemporary U.S. agriculture* (AER-822). Washington, DC: U.S. Department of Agriculture, Economic Research Service. Available at: http://www.ers.usda.gov/publications/aer822/.

Burrell, A.M. (2004) The 2003 CAP reform: implications for the EU dairy sector. *Outlook on Agriculture* 33(1):15-26.

Chantreuil, F., Hanrahan, K. and Levert, F. (2005) The Luxembourg Agreement Reform of the CAP: An Analysis using the AG-MEMOD Composite Model. In Arfini, F. (ed) *Modelling Agricultural Policies: State of the Art and New Challenges*, Monte Universitá Parma Editore, 632-653.

Cocklin, C., Dibden, J. and Mautner, N. (2006) From market to multifunctionality? Land stewardship in Australia. *The Geographic Journal*, 172(3): 197-205.

Colman, D. and Harvey, D. (2004) *The Future of UK Dairy Farming*. Report commissioned jointly by the MDC, DIAL and Defra. Available at http://www.defra.gov.uk/foodrin/milk/pdf/colman-harveyreport.pdf

CSO (2008) *Central Statistics Office*. Database Direct.

Firbank, L.G. (2005) Striking the balance between agricultural production and biodiversity. *Ann. Appl. Biol*, 146: 163-17.

Gerowitt, B., Bertke, E., Hespelt, S.K. and Tute, C. (2003) Towards multifunctional agriculture-weeds as ecological goods? *Weed Research*, 43: 227-235.

Goodwin, B. and Mishra, A. (2005) Another Look at Decoupling: Additional Evidence on the Production Effects of Direct Payments. *American Journal of Agricultural Economics*, *87*(5): 1200-1210.

Hamilton, B. H. (2000) Does Entrepreneurship pay? An empirical analysis of the returns of self-employment. *Journal of Political economy*: 108(3): 604-631.

Hennessy, D.A. (1998) The production effects of agricultural income support polices under uncertainty. *American Journal of Agricultural Economics,* 80: 46-57.

Hennessy, T.C (2004) An analysis of the impact of decoupling. Rural Economy Research Centre. Available at: www.tnet.teagasc.ie/fapri/downloads/pubs2004

Hennessy, T.C. and Thorne, F.S. (2005) How decoupled are decoupled payments? The evidence from Ireland. *Eurochoices*, 4(3): 30-35.

Hoppe, R.A. and D.E. Banker (2006) Structure and finances of U.S. Farms: 2005 family farm report. Economic Information Bulletin No. (EIB-12) May.

Kantelhardt, J. (2006) Impact of the Common European Agricultural Policy (CAP) reform on future research on rural areas. *Outlook on Agriculture* 35(2): 143-148.

Kelch, D. and M.A. Normile (2004). CAP Reform of 2003-04. WRS-04-07. Economic Research Service, U.S. Department of Agriculture. Available at: http://www.ers.usda.gov/publications/WRS0407/

Key, N., Lubowski, R.N. and Roberts, M.J. (2005) Farm-level production effects from participation in government commodity programs: Did the 1996 federal agricultural improvement and reform act make a difference. *American Journal of Agricultural Economics*, 87(5): 1211-1219.

Key, N. (2005) How much do farmers value their independence? *Agricultural Economics*, 33: 117-126.

Key, N. and Roberts, M.J. (2009) Nonpecuniary benefits to farming: Implications for supply response to decoupled payments to decoupled payments. *American Journal of Agricultural Economics*, 91(1): 1-18.

Connolly L, Kinsella A, Quinlan G. and Moran B (2008) National Farm Survey. Teagasc, Rural Economy Research Centre: Ireland.

Moreddu, C., Antón, J., von Lampe, M., Martini, R., Tallard, G. and Vavra, P. (2004) Analysis of the 2003 CAP Reform. OECD paper, Paris.

Randall, A. (2002) Valuing the outputs of multifunctional agriculture. *European Review of Agricultural Economics*, 29(3): 289-307.

Swinbank, A. (1999) CAP reform and the WTO: compatibility and developments. *European Review of Agricultural Economics*, 26(3): 389-407.

Swinbank, A. and Daugbjerg, C. (2006) The 2003 CAP Reform: Accommodating WTO Pressures, *Comparative European Politics*, 4:47-64.

Swinbank, A. and Tranter, R. (2005) "Decoupling EU Farm Support: Does the New Single Payment Scheme Fit within the Green Box? *Estey Journal of International Law and Trade Policy*, 6(1): 47-61.

Tielu, A. and Roberts, I. (1998) Farm Income Support: Implications for Gains From Trade of Changes in Methods of Support Overseas, in *ABARE Current Issues*, 98(4).

Vanslembrouck, I., Van Huylenbroeck, G. and Van Meensel, J. (2005), Impact of Agriculture on Rural Tourism: A Hedonic Pricing Approach. *Journal of Agricultural Economics*, 56(1): 17-30.

Vatn, A., (2002) Multifunctional agriculture—Some consequences for international trade regimes. *European Review of Agricultural Economics* 29(3): 309-327.

Young, E.C and Westcott, P.C. (2000) How decoupled is US agricultural support for major crops? *American Journal of Agricultural Economics*, 82(3): 762-767.

List of tables

Table 1: The impact of decoupled payments

	2005	2010	2015	2020
Grain area harvested (1,000 ha)				
Zero coupling	275.6	245.7	246.3	245.4
Full coupling	275.6	359.2	368.4	368.2
Grain production (1,000 tonnes)				
Zero coupling	2123	2184	2265	2333
Full coupling	2123	3005	3187	3301
Suckler cows (1,000 head)				
Zero coupling	1150	991	885	789
Full coupling	1150	1094	1013	919
Beef production (1,000 tonnes)				
Zero coupling	546	453	402	367
Full coupling	546	485	449	417

Table 2: Impact of decoupled payments 2005-2008

Grain area harvested	**% change**
Actual change	14
Zero coupling	-11
Full coupling	23.6
Suckler cows	
Actual change	-3
Zero coupling	-8
Full coupling	-1.5