RERC – FAPRI Partnership

The Impact of the WTO Doha Development Round on Farming in Ireland

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EXECUTIVE SUMMARY

- This paper reviews the current state of the farming population in Ireland using National Farm Survey data from 2004. The results show that approximately 57 percent of dairy farms, 54 percent of tillage farms and just 15 percent of beef farms were economically viable businesses in 2004. A large number of the economically non-viable businesses may be sustainable due to the presence of other income in the farm household. However, 15 percent of dairy farming households, 21 percent of cattle farming households and 27 percent of tillage farming households were identified as being economically vulnerable.

- The implications of a possible WTO reform for the future of farming in Ireland are also considered in this paper. The scenario analysed (WTO High) involves, among other measures, the abolition of export subsidies for agricultural products with a 50 percent cut in 2007 and a gradual phasing out in equal instalments over the next 9 years.

- The price and cost projections produced by the FAPRI-Ireland model are applied to farm level data to assess the farm-level effect of the policy reform. In brief, the projections include an almost 20 percent reduction in the farm level milk price, a 15 percent decrease in beef prices, and a 2 percent reduction in farm gate wheat and barley prices from 2004 to 2015 following the WTO reform. These price reductions are likely to place considerable pressure on enterprise margins as the costs of production are projected to increase over the same period.

- In the cattle farming and tillage sector, approximately 13 percent and 35 percent of producers respectively are unable to return a positive gross margin in 2015 when export subsidies are abolished. These farmers would find it more profitable to retain their land only to claim their decoupled payments or alternatively to lease out their land if they can earn rent that exceeds their decoupled payment.

- The declining returns to production on cattle and tillage farms increases the likelihood of farmers participating in off-farm employment. Approximately 50 percent of cattle farm operators are employed off farm at present and it is projected that this number will increase to almost 70 percent by 2015. In the tillage farming sector the number of farm operators employed off-farm in 2004 was 38 percent and it is projected that this will increase to 50 percent by 2015. This increase in off farm employment is projected to occur as the demography of the farming sector changes, the returns to production decline and the payments that were previously linked to production are decoupled.

- It is projected that by 2015 following a WTO reform, just 6 percent of cattle farms and 17 percent of cereal farms would be classified as economically viable businesses. This compares to 15 percent of cattle farms and 54 percent of cereal farms at present and 8 percent of cattle farms and 18 percent of cereal farmers in 2015 if there is no WTO reform, i.e. the baseline situation. Furthermore, up to 13 percent of cattle producers and a substantial 35 percent of tillage farmers increase their income by using their land only to claim decoupled payments. The substantial reduction in the number of viable active tillage farms can in part be attributed to the demise of the sugar beet industry in Ireland. In addition, the number of economically vulnerable farms is projected to decline over time. The demographic make up of the cattle and tillage farming population changes and a greater number of young farmers choose to supplement their farm income with off-farm employment. The number of economically vulnerable farms is projected to decline from 21 percent at present to approximately 14 percent by 2015 in the cattle sector, and from 27 percent at present in the cereals sector to 23 percent in the tillage sector.

- The abolition of export subsidies has serious consequences for the milk price and in turn for the number of dairy producers. There were approximately 24,000 dairy producers in 2004 and this number is projected to fall to less than 10,000 in 2015 following the abolition of export subsidies. Even in the absence of a WTO reform,

the number of dairy producers is projected to fall to 15,000 by 2015 as a result of the dairy intervention price reductions agreed under the MTR of the CAP. As a result, the average farm level volume of production is projected to increase from approximately 225,000 litres at present to 350,000 litres in 2015 under the baseline, i.e. no WTO reform, and to 500,000 following the abolition of export refunds.

- The importance of export subsidies to the typical Irish dairy farmer is evident in this analysis. The results of this analysis shows that following the abolition of export subsidies, even if a typical farmer could double production within their existing resources, that this increase in production would still be insufficient to maintain current income levels.

- The results of the analysis show that in many regions the supply of milk quota is likely to exceed the demand and that the value of milk quota would be greatly reduced if export subsidies are abolished. Indeed the economic outlook for dairy farming in a situation where export subsidies have been substantially reduced is such that one would seriously need to question the value of retaining the milk quota system.

- Despite the projected rationalisation in the dairy farming sector, the total number of economically viable dairy farm businesses is projected to decline from approximately 13,500 at present to 10,000 in 2015 in the baseline and to decline further to less than 8,000 under a WTO scenario.

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The Impact of the World Trade Organisation Doha Development Round on Farming in Ireland

Thia Hennessy and Fiona Thorne

Rural Economy Research Centre

1. Introduction

The Doha Development Agenda (DDA) was launched at the fourth ministerial conference of the World Trade Organisation, which was held in Doha in November 2001. The objectives of the DDA are underpinned by commitments to substantially strengthen the assistance provided to the developing world by further liberalising world trade. In relation to agriculture, the objective is to establish a fair and market-oriented trading system through a programme of fundamental reform. Member governments are committed to comprehensive negotiations aimed at: reforming market access, reducing, with a view to phasing out, all forms of exports subsidies in addition to substantial reductions in domestic support to agriculture which distorts trade. Following a deadlock in talks at the fifth ministerial conference in Cancún, some agreement was reached at the Hong Kong sixth ministerial conference on the elimination of export subsidies while negotiations on market access and domestic support is still ongoing with a completion date of 2006.

In this paper we focus on the effect of a possible WTO policy reform on the economic viability of farming in Ireland and on the sustainability of Irish farm households. The analysis follows the general RERC-FAPRI methodology whereby the effect of a hypothetical policy scenario is compared to a situation, known as the baseline, where current policy agreements are continued indefinitely into the future. Price and cost projections emanating from the RERC-FAPRI sector level model (Binfield *et al.* 2006) are applied to 2004 Irish National Farm Survey data. Farm level economic models are implemented to estimate how farmers are likely to respond to policy change and to assess the consequent impacts on farm income, economic viability and household sustainability.

The paper begins by outlining the assumptions of the baseline and WTO scenarios and by presenting the price and cost projections produced by the RERC-FAPRI sector level model. Following this, a brief description of the methodology applied to simulate farmers' behaviour is provided and the composition of the farming population in Ireland in 2004 is reviewed. This review is followed by the analysis of a hypothetical WTO reform and baseline scenarios and the paper concludes with a general discussion of the implications of such a policy reform for farming in Ireland.

2. Baseline and WTO Scenarios

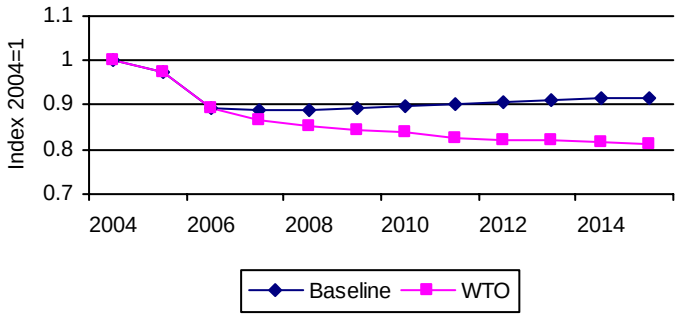
The baseline scenario assumes a continuation of current policies and international trade agreements. In other words, it is assumed that the policies agreed under the Medium Term Review of the CAP in 2003 are implemented and that direct payments remain decoupled from production. The MTR allowed for the decoupling of all direct payments from production but made provision for Member States to delay the introduction of decoupling (until 2007 at the latest) and to partially "recouple" certain proportions of the

historic direct payments to production. The RERC-FAPRI baseline analysis incorporates the differential Member State implementation of the reformed CAP allowed for under the Luxembourg Agreement. Further information on the specification of the baseline scenario is available from (Binfield *et al.* 2006). The Binfield *et al.* study (2006) analysed three possible WTO reforms. In this study the analysis focuses on the implications of the WTO High scenario. The details of the WTO High scenario are as follows;

- Domestic Support – 70 percent reduction in the aggregate measure of support (AMS) based on Uruguay Round Agreement on Agriculture final bound levels.
- Export Competition – Phasing out of EU export subsidies over the course of 10 years with the elimination front loaded with a 50 percent cut in export subsidies in 2007 of the reform with the remaining export subsidies eliminated in equal installments over the remaining 9 years
- Market Access – 60 percent average cut in tariffs, with a 25 percent cut in tariffs applied to sensitive products.
- No expansion of tariff rate quota is associated with the designation of beef and butter as sensitive products.

Figure 1 presents the RERC-FAPRI projections of the Irish farm level milk price (Binfield et al. 2006). The farm level milk price is projected to decline in the baseline as a result of reductions in EU commodity prices agreed under the MTR of the CAP in 2003. The EU cheese, skimmed milk powder and butter prices are projected to decline by 5, 8 and 23 percent respectively as a direct result of the cuts in intervention prices. This results in an almost 10 percent decline in the farm level milk price in 2015 when compared to 2004 levels. Under the WTO scenario, export refund expenditure limits will be close to zero by 2015, leading to sharp reductions in cheese, butter and whole milk powder exports from the EU and Ireland to non-EU markets. Skimmed milk powder prices, however, will be less impacted by the elimination of export refunds as the EU SMP price is already closer to the world price. It is projected that the elimination of export subsidies in conjunction with the reduction in import tariffs is likely to lead to further declines in commodity prices than projected under the baseline. Binfield *et al.,*(2006) project the price of butter to decline by 18 percent, the price of cheese to decline by 10 percent and the price of SMP by 6 percent relative to the 2015 baseline levels. The overall effect is that the Irish farm level milk price is projected to decline further under the WTO scenario than under the baseline. Relative to 2004, the Irish farm level milk price is projected to be almost 20 percent lower by 2015 under a WTO scenario compared to 10 percent in a situation where there is no WTO reform.

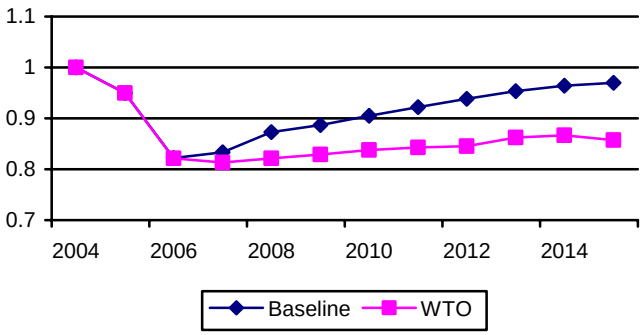
Figure 1: Projections of Milk Prices Baseline and WTO Scenarios



Source: RERC-FAPRI Model (Binfield et al., 2006)

Figure 2 presents the RERC-FAPRI projections of the adult reference beef price under the baseline and WTO scenarios. Under the baseline the decoupling of beef direct payments is introduced across the EU in 2005. It is projected that in the initial years of decoupling, beef slaughterings will increase resulting in a short-term increase of supply in the beef market and therefore, a reduction in the beef price. This initial price shock is presented in Figure 2 as the substantial price reductions occurring in 2005 and 2006. It is projected that after this initial price shock, the beef breeding herd in Ireland, namely the suckler cow herd, will decline thus resulting in a contraction in beef supply and a recovery in the beef price. The beef price is projected to almost recover to 2004 levels by 2015 under the baseline scenario. The recovery however, is not as substantial under the WTO scenario. The elimination of export subsidies under the WTO scenario results in a considerable decline in beef exports from the EU. Binfield et al., (2006) project that exports of beef from the EU would be almost 70 percent lower following a WTO reform than under a continuation of current policies. Beef that would otherwise have been exported from the EU with subsidy is diverted onto the EU internal market, increasing supply and thus depressing price. The result is that beef prices under the WTO scenario fall by approximately 15 percent from 2004 to 2015.

Figure 2: Projections of Beef Prices Baseline and WTO Scenarios

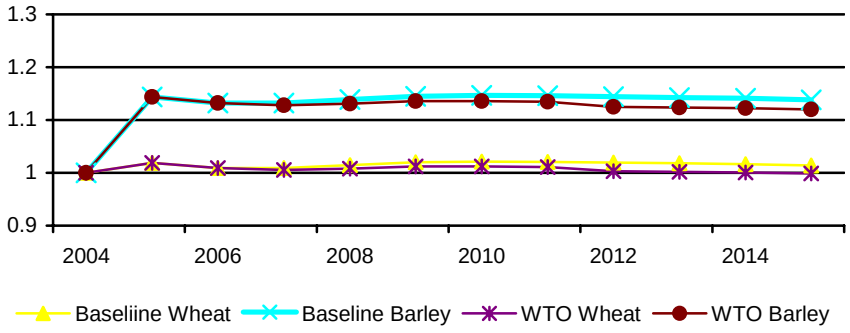


Source: RERC-FAPRI Model (Binfield et al., 2006)

Figure 3 presents the RERC-FAPRI projections for feed barley and feed wheat prices in Ireland under the baseline and WTO scenarios. Under the baseline, world commodity markets are projected to be characterised by relatively buoyant prices when considered in US dollars. Strong economic growth, particularly in Asia, but also in Europe and North America, leads to increased demand for cereals both for human consumption and as an animal feed. However, the projected depreciation of the US dollar against the euro means that EU wheat and barley prices, which largely determine Irish wheat prices, are projected in nominal terms to be largely unchanged over the projection period, remaining close to intervention levels. The baseline level of Irish feed wheat prices in 2015 is projected to be largely unchanged from the level in 2004, while Irish feed barley prices are projected to be up over 13 percent from the low levels observed in 2004.

Under the WTO High Scenario, cuts in export subsidies and the reductions in the tariff protection afforded to EU grain markets, leads to slightly lower internal EU prices for all of the major grains than under the Baseline. The internal EU price declines in the scenario, relative to the baseline, largely reflects the impact of the elimination of export refunds. Reduced EU grain prices are reflected in lower Irish grain prices with the Irish soft wheat price 1.5 percent lower and barley prices approximately 5 percent lower, under the WTO High scenario than the baseline levels by 2015.

Figure 3: Projections of Irish Feed Wheat and Barley Prices Baseline and WTO Scenarios



Source: RERC-FAPRI Model (Binfield et al., 2006)

3. Methodology

The RERC-FAPRI farm level model involves integrating econometric and optimisation models. A multi-period profit maximising linear programming (LP) framework is used to simulate production decisions. Linear programming is an optimisation technique which operates by maximising or minimising an objective function subject to a number of constraints. In this case the objective function is assumed to be profit maximisation and farm net margin is maximised over the ten year period following decoupling in a block diagonal matrix form subject to the usual physical, financial, technological and policy related

constraints. Irish National Farm Survey (NFS) data are used to specify the models. All activities that exist on the farms in the base data year, 2004, are included in the LP choice set as well as all likely activity options. Transfer activities are used in the LP model to link multi-year activities, such as livestock systems. The input-output co-efficients used are those recorded in the base year and are assumed to remain fixed through time despite policy changes, in other words for any given production process only one combination of the factors of production is assumed. Hence the scope of the models is confined to the analysis of resource allocation decisions, enterprise mix and volume of production decisions, participation in policy schemes and the resulting impact of these decisions on income. The advantage of LP for use in policy analysis is that it does not rely on time-series data and it does not extrapolate future relationships from historical ones, and therefore it can go beyond the realm of past observations and analyse unprecedented changes. This is a major advantage in the analysis of policy scenarios that may differ substantially to previously implemented policies.

The disadvantages of using LP however are its normative nature and its limited scope to project changes to the structure of farming, i.e. farm numbers, composition of the farming population in terms of the number of full and part time farms and so forth. To overcome these weaknesses, the RERC-FAPRI farm level modelling system supplements the LP model with a number of exogenously estimated models of farmer behaviour that can quantify the effects of non-pecuniary factors on farmers' decision-making. Three exogenous models are estimated: first, entry to and exit from farming; second, labour allocation; and third, land and milk quota distribution. The first model simulates the Irish farming population. The second model estimates the number of part-time farmers and the amount of farm labour to provide the right hand side parameters for the labour constraint in the LP models. The third model simulates the allocation of land and milk quota; again, to provide the right hand side parameters for the land and quota constraints in the LP models.

The entry and exit model is an econometric model based on retirement and succession. The entry decision is modelled as the occupational choice of the nominated farm heir. The heir is faced with a discrete choice of whether to enter farming as a full-time occupation, a part-time occupation or to enter a non-farming occupation. This decision is modelled using a multinomial logit model. This model uses data on farm heirs that have already made occupational choices and from that data estimates the probability of future farm heirs entering farming based on their personal and farm characteristics. This model is used to examine the effect of policy reform on the number of new entrants to farming. From this, inferences on the implications for total farm numbers are drawn. The decision of farm operators to engage in off-farm employment is also modelled using econometric techniques. The decision of the farmer to engage in off-farm employment is a binary one and therefore can be modelled using a probit model. Like the multinomial model, the probit model uses data on the farmers that are currently employed off the farm and from this can estimate the probability of farm operators engaging in off-farm employment given a change in policy. The number of hours spent working off the farm is also modelled in a similar manner. Finally, the decision to exit the dairy enterprise and to sell the milk quota off the farm is also modelled.

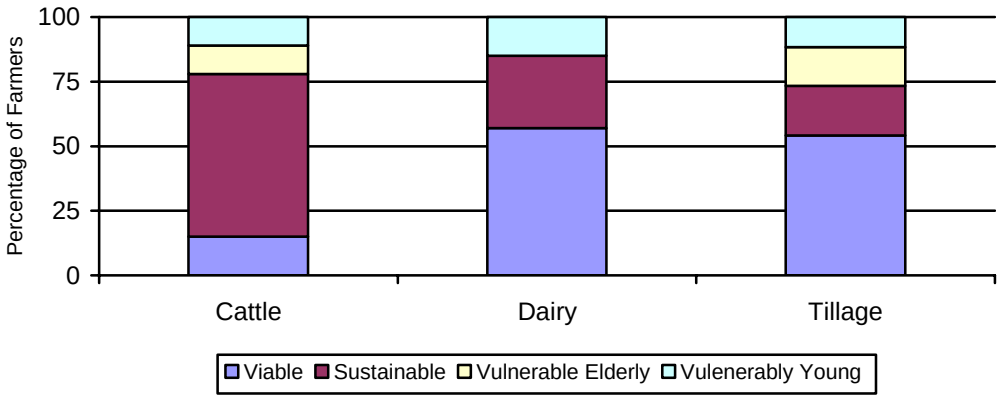
The estimation of exit from dairying is based on a profitability analysis. Historical levels of profitability and the rate of exit from dairying are examined to identify a minimum level of profitability below which exit has occurred historically. Using the LP model producers operating below the minimum level of profitability are projected to exit production. The Irish milk quota transfer system is simulated and the milk quota of exiting farmers is reallocated based on the rules governing the transfer of quota. Further information on the RERC-FAPRI farm level modelling system is available from Hennessy (2006) and Hennessy and Rehman (2006).

4. Farming Population in Ireland in 2004

The impact of any policy reform is likely to be inequitable and differentiated with some farmers benefiting and others losing, by adapting stratagems such as off-farm employment, enterprise substitution and/or specialisation, for example. It is important, therefore, to consider the full impact of policy reform on both the viability of the farm business and the sustainability of the household. Such effects are assessed in this paper by drawing from a framework developed by Frawley and Commins (1996). Within this framework, an economically viable farm business is classified as one having (a) the capacity to remunerate unpaid family labour at the minimum agricultural wage, and (b) the capacity to provide an additional 5 per cent return on non-land assets. Farms that are not economically viable but where there is some off farm income present, i.e. the farmer or the spouse participates in off-farm employment, are classified as nonviable but sustainable, as the off-farm income contributes to the long-term sustainability of the household.[1] Households that do not have an off-farm income and operate an economically nonviable business are considered vulnerable. Vulnerable farm households are also assessed on their demographic composition. A vulnerable farm household where the farm operator is aged sixty-five or more is classified as vulnerable elderly while all others are classified as vulnerable young. Figure 4 shows the composition of the 2004 Irish farming population.

[1] **It is possible that other members of the farm household may be engaged in off-farm employment, however, only the employment status of the two heads of households are considered in this case. It is also possible that there may be other sources of off-farm income in the households, such as returns on investments, social welfare or pension payments. These income flows are not considered in this analysis.**

Figure 4: Composition of 2004 Irish Farming Population



Source: Author's Own Calculations (2006).

According to the National Farm Survey (2004) there are approximately 57,000 cattle farms including the cattle rearing and cattle finishing enterprises. The average family farm income in 2004 was €10,297 while 44 percent of farm operators reported having earnings from employment off the farm and 63 percent of spouses. When the value of unpaid family labour and capital invested in non-land assets is considered, the results show that just 15 percent of the cattle farms in Ireland are operated as economically viable farm businesses. However, a large number of cattle farming households have another source of income and therefore 63 percent of farm households, approximately 35,000 households, can be considered as economically nonviable businesses but potentially sustainable households. Of the 35,000 households, almost 23,000 farm operators report having earnings from off-farm employment while in the other 12,000 households only the spouse works off the farm. Almost 13,000 cattle farming households are considered vulnerable as the farm business is not economically viable and neither the farmer nor the spouse works off the farm. Almost half of these vulnerable households are classified as elderly as the head of household, the farm operator, is aged 65 years or more, while in the other households the head of households is aged less than sixty-five.

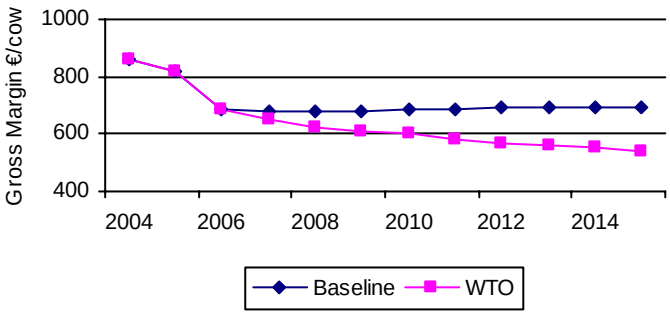
The results show that when the labour on dairy farms is remunerated at the minimum agricultural wage and when a 5 percent return on non-land assets is considered, just 57 percent of farm businesses are economically viable. Approximately 34 percent of dairy farming households do not operate a viable dairy business but the household may be sustainable due to the presence of other income in the household. Finally, 14 percent of dairy farming households are classified as vulnerable as the farm business is not economically viable and neither the farmer nor the spouse are employed off the farm. Finally, according to the National Farm Survey there were approximately 7,500 specialist tillage farms in 2004, on which the average family farm income was €24,012. In addition, 38 percent of farm operators reported having earnings from employment off the farm and 22 percent of spouses. When the value of unpaid family

labour and capital invested in non-land assets is considered, the results show that 54 percent of the specialist tillage farms in Ireland are operated as economically viable farm businesses. However, a number of the remaining farming households have another source of income and therefore 19 percent of farm households, approximately 1,400 can be considered as economically nonviable businesses but potentially sustainable households. Almost 27 percent (approximately 2,000 households) of the specialist tillage farming households are considered vulnerable as the farm business is not economically viable and neither the farmer nor the spouse works off the farm. Just over half of these vulnerable households are classified as elderly as the head of household, the farm operator, is aged 65 years or more, while in the other households the head of households is aged less than sixty-five.

5. Outlook for Enterprise Gross Margins

By taking the price and cost projections estimated by Binfield *et al.,* (2006) for the baseline and the WTO scenario, it is possible to project gross margins for various farm systems under both scenarios. Figure 5 presents estimates of the gross margin per dairy cow for a typical Irish dairy farm. The gross margin estimates include the coupled return to production only; the decoupled payment is not included. The yield per cow is fixed over time at 5,000 litres and the gross margin is recalculated for the baseline and WTO high scenarios. The data in Figure 5 show that dairy enterprise gross margins are projected to decline substantially under both the baseline and WTO scenarios going forward. The decline is due mostly to falling milk and calf prices in combination with modest increases in direct costs. The combined effect of falling output prices and rising direct costs is that the coupled gross margin is projected to decline by approximately 18 percent from 2004 to 2015 in the baseline. It should be noted however that the enterprise would attract a decoupled payment of approximately €190 in both scenarios. As discussed in section 2 above, the WTO reform is likely to lead to lower calf and milk prices and thus result in further erosion of the dairy enterprise gross margin. It is projected that gross margins will fall by almost 35 percent between 2004 and 2015 as a result of the WTO reform.

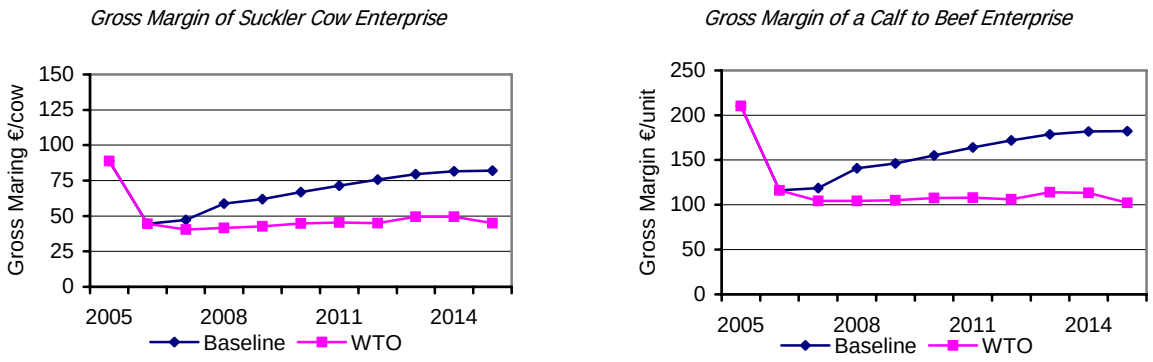
Figure 5: Estimates of Dairy Enterprise Gross Margin



Source: RERC-FAPRI Farm-Level Model (2006).

Figure 6 presents estimates of the gross margins earned on two beef systems. The first is a suckler cow system which involves the sale of weanlings, while the second system is a calf to beef system which involves purchasing calves, rearing them for two years and selling them for slaughter. Again, the margins presented reflect changes in the coupled returns to production only; the decoupled payment is not included.

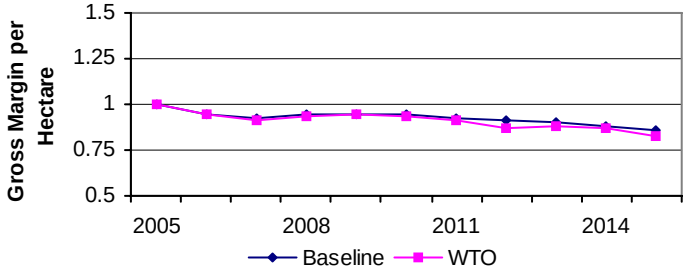
Figure 6: Estimates of Suckler Cow and Calf to Beef Enterprise Gross Margins



Source: RERC-FAPRI Farm-Level Model (2006).

The margins of both systems fall significantly in the initial years of the projection period for both scenarios. This is a result of decoupling and lower beef prices. However, in keeping with the beef price projection, the margins almost recover to 2005 levels by 2015 in the baseline scenario. The projections however, are not as optimistic for the WTO scenario. The gross margins for both enterprises decline by almost 50 percent between 2005 and 2015 under the WTO scenario. Figure 7 presents estimates of the gross margin for spring barley, for the baseline situation and the WTO scenario. Similar to the dairy and the beef presentations, Figure 7 also presents the changes in the coupled returns to production. The margin per hectare falls in both the baseline and the scenario which is in line with falling prices over time and a parallel increase in direct costs. In the WTO scenario it is projected that gross margins will fall by just over 15 percent by 2015 relative to those margins achieved in 2005.

Figure 7: Estimate of Gross Margin for Spring Barley in the Baseline and WTO Scenario



Source: RERC-FAPRI Farm-Level Model (2006).

6. The Outlook for Farming

The outlook for farm incomes is largely dependent on how farmers respond to the changing price and cost projections and changing policies. Farmers have a number of options to maintain and/or increase their incomes. They can reformulate their farm plan to maximise income from the market by changing what they produce and how it is produced. Dairy farmers may choose to sell their milk quotas and shift into drystock farming or exit the sector completely. While others may choose to maximise total income by working off farm and allocating less time to farm work. For some farmers the most viable option may be to "do nothing", that is destock the land, allow it to go fallow and to use it only to claim decoupled payments. In this section of the paper, the methodologies outlined above are applied to Irish National Farm Survey data to simulate farmers' behaviour under a baseline and a WTO scenario. When farmer behaviour is simulated, the consequences for farm incomes, for the viability of the farm business and the sustainability of the household are estimated. The ensuing sections of the paper describe the outlook for cattle, dairy and tillage farming post WTO reform.

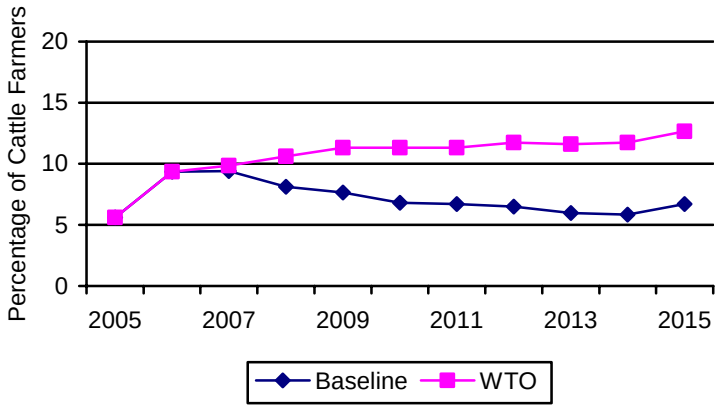
6.1 The Outlook for Cattle Farms

The RERC-FAPRI farm level modelling system is applied to NFS data on cattle rearing and cattle finishing farms to simulate the effect of a WTO reform. There are approximately 485 observations representing over 57,000 farms nationally. The implications of the WTO reform for farm income, the number of part-time farms and the overall composition of the cattle farming population are considered.

When decoupling was first announced many predicted a mass destocking of land and the emergence of a new generation of 'sofa farmers'. However, analysis at the time showed that the extent of such farming practices was likely to be quite low as the vast majority of farmers were in a position to operate some business in a profitable capacity when measured in gross margin terms, see Breen et al., (2005) for further information. However, it is interesting here to revisit the question of entitlement farming, i.e. farmers that produce no tangible product but retain their land to collect their decoupled payment, in the context of a WTO reform. In a decoupled environment, a profit maximising farmer engages in production only if a market profit can be returned. To activate the decoupled payment, farmers must retain their land and adhere to some cross compliance measures which are likely to result in some costs. Furthermore, farmers will still incur the majority of their fixed costs regardless of their production decision. Fixed costs that are not disposable in the longer term such as interest repayments, depreciation of buildings and maintenance of land will be incurred regardless of the level of agricultural activity. Hence the model is structured such that farmers engage in entitlement farming if the market returns to production, i.e. market revenue less all variable costs, fixed costs and the opportunity cost of labour is less than the decoupled payment less compliance costs and fixed costs that are not disposable in the longer term. Figure 8 presents projections of the number of entitlement cattle farmers, that is farmers

that are engaged in cattle farming in the base period but would maximise their farm incomes in the future by completely destocking and using their land only to collect their decoupled payment.

Figure 8: Projections of the Number of Cattle Entitlement Farmers



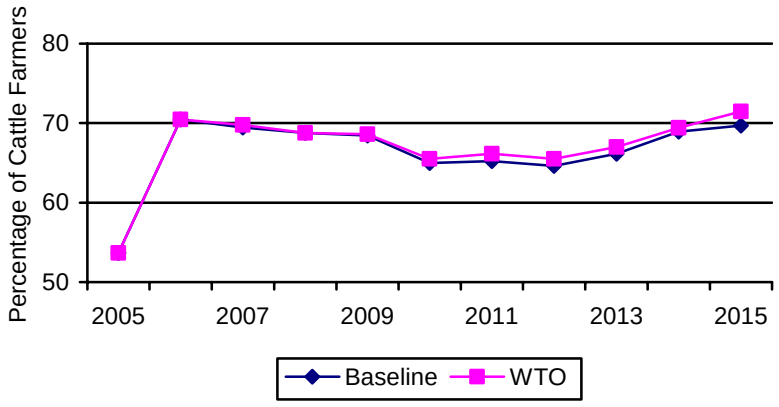
Source: RERC-FAPRI Farm-Level Model (2006).

Figure 8 shows that between 5 and 10 per cent of Irish cattle farmers would financially benefit by completely destocking and only using their land to activate their decoupled payment in the baseline scenario. Given the baseline price projections, it is estimated that the remaining 90 per cent can return a positive market based gross margin in some livestock enterprise post decoupling. The number of entitlement farmers is at its highest in the baseline in 2006 and 2007 as this is when beef prices decline. As prices recover from 2007 to 2015 a number of the entitlement farmers find it profitable to re-engage in production. The opposite is true however in the WTO scenario; as beef prices do not recover as much under the WTO scenario, the number of farmers engaged in entitlement farming increases to approximately 13 percent in 2015. The entitlement farmers tend to farm a smaller area (28 hectares) than average (37 hectares) and the majority of them are also employed off the farm. However, they still account for some 200,000 hectares of land nationally. Farmers will have the option to lease out their land in both the baseline and WTO scenario. However, the decoupled payment will be paid to the farmer actively farming the land. Therefore, there is no financial incentive to lease land unless rental values exceed the payment per hectare less the compliance costs. This is likely to result in inflation or at least a stagnation of land rental prices in Ireland. Clearly, many entitlement farmers would lease out their land if there was sufficient demand. However, it is difficult to estimate at the micro level the amount of land that is likely to be exchanged on the rental market.

The allocation of farmers' labour between farm work and off farm employment is an important issue for the future of cattle farming. According to NFS data, approximately 50 per cent of cattle rearing farmers and 44 percent of cattle finishing farmers had an off farm job in 2004. The amount of time worked off farm varied from farmer to farmer but the average time in the year 2004 was 190 standard man days.

The number of farmers engaged in off-farm employment and the amount of time spent working off farm may have implications for the level of activity on cattle farms and in turn on farm incomes. Therefore, to make projections of income on cattle farms it is also necessary to make projections of off farm labour supply. There are a variety of reasons why the number of farmers participating in off farm employment may be affected by an agricultural policy reform. First, a policy reform may cause a change to the wage differential that is the difference in wages a farmer may receive from farming versus some off-farm job. For example, the decoupling of direct payments reduced the hourly return to time spent farming therefore making off-farm employment relatively more attractive, other things being equal. If the WTO scenario results in a further decline in the return to farm labour as indicated by the enterprise gross margins presented above, then one would expect that the number of farmers engaging in off-farm employment would be likely to increase as a result of decoupling. However, the probability of farmers participating in the off-farm labour market is subject to a number of other factors, such as personal characteristics, like age, education levels and composition of the farm household and other financial variables like net worth and other non-farm income in the households. All of these factors are included in the probit model and the results of the model are presented in Figure 9.

Figure 9: Projections of Participation in Off-farm Employment by Cattle Farmers



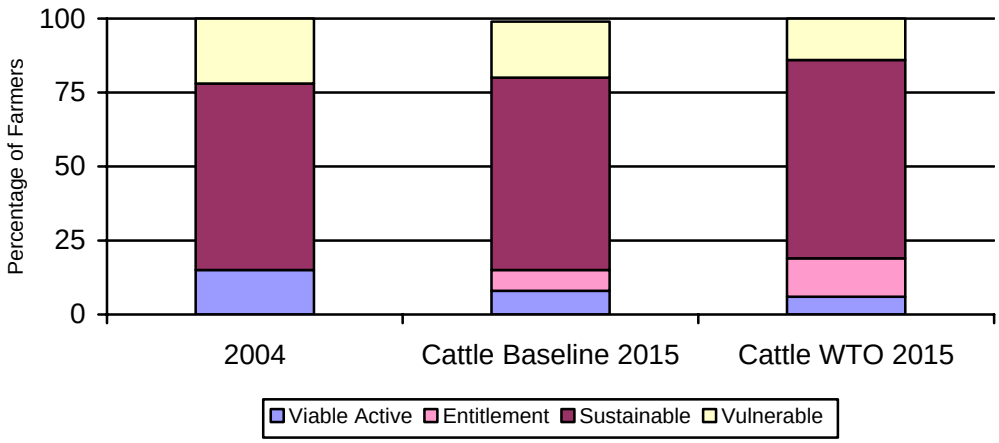
Source: RERC-FAPRI Farm-Level Model (2006).

Figure 9 presents a substantial increase in the number of farmers that are likely to seek employment off the farm in the 2005 to 2007 period. This is a result of the decoupling of direct payments, as a substantial decline in the return to on-farm labour is projected during this period. Under the baseline scenario the number of cattle farmers employed off the farm is estimated at between 65 and 70 percent between 2007 and 2015. This figure increases only slightly, by about 2 percent of farmers, under the WTO scenario although there is a further deterioration in the return to farm labour. The off-farm employment participation decision is also affected by demographic details such as age, education levels and household composition. The results of the labour model show that the shift to off-farm employment participation is at almost saturation point at 70 percent as the remaining 30 percent of farmers are unlikely to work off-farm for demographic reasons.

The above projections assume that farmers will successfully secure off-farm employment if they so desire as the model takes account of the current macroeconomic and unemployment rates only. Although unemployment still remains low in Ireland, at about 5 percent, and the short to medium-term macroeconomic outlook is favourable, there is now a fear that some of the more "traditional" sectors of the economy, in which farmers are usually employed, are vulnerable to future job losses. Occupational and demographic data reveals that farmers are mainly employed in low-skilled occupations in the more "traditional" sectors of the economy. Traditional low-tech manufacturing operations are expected to continue to move to low-cost locations worldwide. A recent study has shown that rural areas, and in particular the Border, Midlands and West region, have a disproportionate share of low technology, old enterprises such as textiles, clothing and wood products (Commins 2005). In addition, it is expected that the construction sector will revert to a lower growth path. All of these developments may adversely impact on the off-farm employment opportunities for farmers thus raising further economic problems.

Figure 10 presents the projected composition of the cattle farming population in 2015 under both the baseline and WTO scenarios. Figure 4 above showed that in 2004 approximately 15 percent of cattle farming businesses were economically viable. The percentage of economically viable cattle farming businesses is projected to fall overtime. Declining beef prices and rising costs reduces the returns to resources invested in cattle farming relative to labour employed elsewhere in the economy. According to the RERC-FAPRI farm level model, by 2015 the number of economically viable cattle farming businesses will have effectively halved, with just 8 percent of cattle farming businesses projected to be viable in the baseline and just 6 percent in the WTO reform scenario.

Figure 10: Composition of Cattle Farming Population - 2004 and 2015



Source: RERC-FAPRI Farm-Level Model (2006).

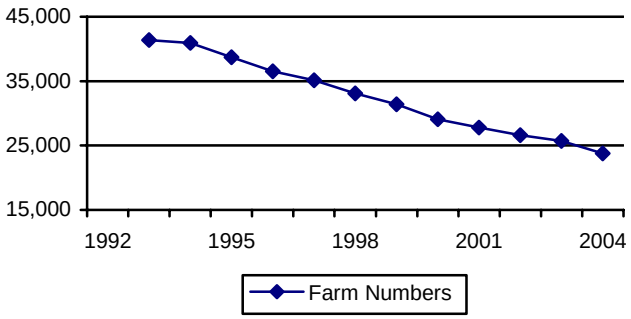
The projected cattle farming populations in 2015 include a new classification of farmers, that is entitlement farmers. The majority of entitlement farmers are economically viable because there is very

little investment on these farms in terms of labour input or investment in livestock as entitlement farmers do not engage in production. However, these farms are highly dependent on the continuation of the Single Farm Payment. The percentage of farmers engaged in entitlement farming is higher under the WTO scenario than the baseline; this is reflective of the poorer returns to production under the WTO scenario. The number of sustainable farm households increase over time as more farms become economically nonviable and as more farmers opt to participate in off-farm employment. The number of vulnerable farm households, that is households that do not operate an economically viable farm business and neither farmer nor spouse has an off-farm income, declines over time as more farmers opt to work off the farm or switch into entitlement farming which is a more economically viable farm operation.

6.2: The Outlook for Dairy Farms

In Ireland, dairy production is generally considered to be one of the most lucrative farming systems. In 2004, the average family farm income on specialist dairy farms in Ireland was approximately €34,500 compared to just under €7,000 on cattle rearing farms, the poorest sector (NFS 2004). National Farm Survey figures also show that on average, dairy farm incomes exceed average industrial wages. However, despite the apparent relative profitability of dairy farming, dairy farm numbers are declining faster than any other system of farming. According to DAFRD figures (2004) there are approximately 24,000 active dairy producers in Ireland currently supplying the national quota of 1,100 million gallons of milk. This compares to 28,000 in 2001 and a significantly larger 42,000 active suppliers ten years earlier in 1993.

Figure 11: Actual Total Dairy Farm Numbers for a Baseline Scenario



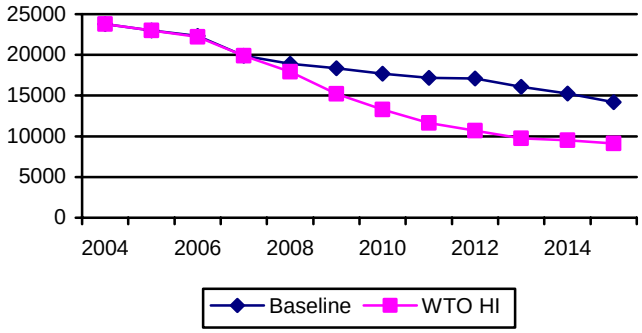
Source: Department of Agriculture Food and Rural Development

Previous policy analysis studies by the RERC-FAPRI Partnership projected that the decoupling of direct payments and the reduction in dairy intervention prices agreed in the MTR was likely to cause a considerable exodus from dairy farming. Breen and Hennessy (2003) projected that the number of dairy producers in Ireland would fall from approximately 26,000 in 2002 to 18,000 producers in 2012 as a result of the MTR of the CAP. Given that the milk price is projected to fall further in the WTO scenario under consideration here, the implications for dairy producer numbers are likely to be more negative.

Producing projections of the future number of dairy producers is complex and methodologically challenging. The decision of dairy farmers to exit milk production can be influenced by a variety of factors including demographic (i.e. the lack of a successor at retirement), economic (i.e. low profitability) or other non-economic factors (i.e. lifestyle choices, personal circumstances etc.). In the absence of verifiable empirical data on the non-economic factors influencing the decision to exit milk production, we assume that a farmer's decision to exit production is based on farm profitability and demographic factors only. In relation to retirement and succession, data is available from the NFS on farmers' ages and therefore a retirement rate is assumed for each year of the projection period. The multinomial logit model of succession described earlier in the paper is used to estimate the probability of each farm being continued by a successor and the probability of each farm ceasing production. The probability estimations are influenced by, among other things, the profitability of the dairy enterprise, therefore a reduction in the returns to resources employed in dairy production, as expected following the WTO reform, would reduce the probability of succession and increase the number of dairy farms exiting production. In relation to the economic factors affecting dairy producer numbers, historical levels of profitability and the historical rate of exit from dairy farming were examined using NFS and DAFRD figures. Minimum levels of profit below which exit has typically occurred in the past were established. For both scenarios under investigation in this paper, dairy farm incomes were simulated and producers operating below the same minimum level of profitability were projected to exit the sector. As the WTO reform is likely to reduce the returns to production considerably, the number of farmers operating below the critical minimum level of profitability is likely to be greater under the WTO scenario than the baseline, hence resulting in a greater rate of exit from production under the WTO scenario compared to the baseline.

Figure 12 below presents projections of dairy farm numbers in the baseline and WTO scenarios. Under the baseline scenario, a significant number of dairy farmers are estimated to exit production as declining milk prices and rising production costs squeeze margins. Producer numbers are projected to fall from approximately 24,000 farmers in 2004 to approximately 14,000 in 2015. The further erosion of milk price due to the WTO scenario squeezes margins further, thus reducing the probability of retiring dairy farmers being replaced and placing additional financial pressure on younger dairy farmers. The results show that the abolition of export subsidies in the WTO high scenario would have very severe consequences for dairy producer numbers with more than half of them exiting production over the next ten years. It is projected that active dairy producer numbers would fall to approximately 9,000 by 2015 as a result of the WTO reform.

Figure 12: Projections of Dairy Producer Numbers



Source: RERC-FAPRI Farm-Level Model (2006).

In a sector bound by production quotas, the exit of producers results in an increase in the availability of milk quota and an increase in the average volume of production. According to NFS (2004) data, the average milk producer size was 225,000 litres in 2004. The average size of production is projected to increase to almost 350,000 litres by 2015 under the baseline scenario and to almost 500,000 litres under the WTO scenario. However, it should be noted that under the WTO scenario, the supply of milk quota exceeds the demand in many of the ring-fenced regions and in the smaller size categories. Although additional research is required, the initial results suggest that the value of quota would fall considerably under the WTO scenario and that the value of retaining the quota system at all would need to be carefully considered.

Many of the farms projected to remain in business in 2015 in both the baseline and WTO scenarios will expand production considerably. However, it should be noted that the additional production will be at a lower milk price and will not attract the compensation which was decoupled in 2005 and therefore an additional litre of milk produced in 2015 without export subsidies will return a much lower margin than an additional litre produced in 2005. Table 1 presents the example of a typical Irish dairy farmer, who supplied 250,000 litres of milk in 2004, stocked a herd of 50 dairy cows and 50 livestock units of bullocks. We assume that this farmer received an annual average milk price of 26 cent per litre in 2004 returning a gross margin of approximately €850 per cow. This combined with the return to beef production, which includes two special beef premia and a slaughter premium per livestock unit, produced a farm gross margin of €62,500 in 2004.[2] Following decoupling, this farmer is entitled to €19,000 of a decoupled payment linked to the beef herd and a payment of €9,000 linked to the quota available on the farm in the reference period. If we assume that this farmer is in a position to replace his drystock herd with dairy cows, i.e. all of his grazing land is in close proximity to the milking parlour, then the farmer could increase the number of dairy cows from 50 to 100 by 2015 assuming the availability of quota. However, the additional 50 cows would not attract the decoupled compensation and the milk produced would earn a lower price. The results show that the gross margin from the dairy enterprise in 2015 would be €62,500

[2] **It should be noted that gross margin is not an income figure as overhead costs have not yet been deducted.**

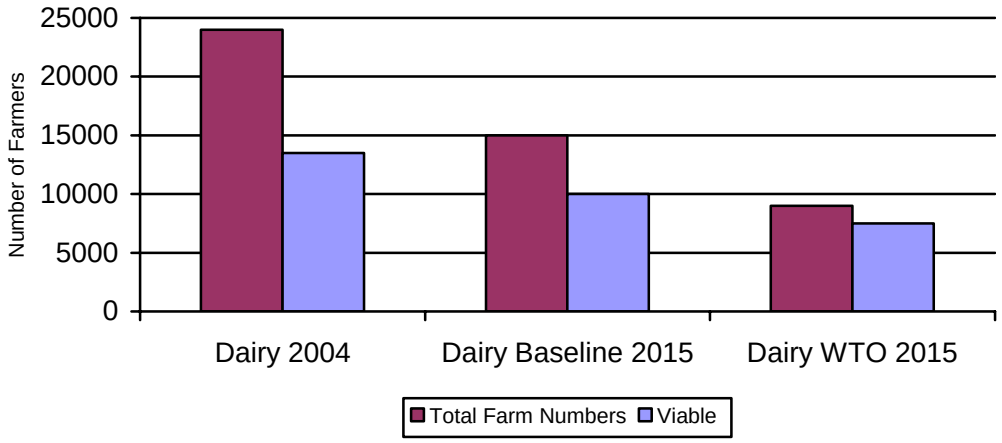
(not allowing for inflation) under the baseline and €52,500 under the WTO scenario if production was increased to 5000,000 litres. If inflation is assumed to average at 2 percent per year between 2004 and 2015 then the real farm gross margins earned declines to €72,750 in the baseline and €64,750 in the WTO scenario. It should be noted that the gross margin figures do not allow for the investment costs associated with increasing production from 250,000 to 5000,000 litres. Although the additional cows on the farm replace bullocks and are grazed on existing land, the farmer will at minimum incur the investment costs associated with purchasing the additional quota and depending on the farm in question it may also be necessary to upgrade the milking parlour and animal housing. The bottom line therefore, is that even in a best case scenario a dairy farmer currently producing 250,000 litres of milk can double production on existing resources, that this will still not be sufficient to maintain incomes in real terms if export subsidies are abolished. It is clear that major restructuring and consolidation is likely to occur following such a policy reform.

Table 1: Economic Analysis of Typical Dairy Farm

	2004	2015 -Baseline	2015-WTO
Dairy Cows	50	100	100
Milk Sold (Litres)	250,000	500,000	500,000
Gross Margin Per Cow	850	650	520
Dairy Gross Margin	42,500	62,500	52,500
Beef (livestock Units)	50	-	-
Gross Margin Per Unit	400	-	-
Beef Gross Margin	20,000	-	-
Decoupled Payment (Beef)	-	19,000	19,000
Decoupled Payment (Dairy)		9,000	9,000
Nominal Farm Gross Margin	62,500	90,500	80,500
Real Farm Gross Margin	62,500	72,750	64,750

As explained earlier in the paper, there were approximately 24,000 dairy producers in 2004, 13,500 of which were economically viable businesses. Figure 13 presents projections of total dairy farm numbers as well as the number of farms that are projected to be economically viable businesses. As the number of dairy farms reduces over time, the proportion that are economically viable increase as the least profitable farms exit production and the remaining farms increase supply. Despite the rationalisation of the dairy farming sector, the results show that the total number of economically viable dairy farming businesses will decline from 13,500 at present to 10,000 by 2015 in the absence of any WTO reform to less than 8,000 if export subsidies are abolished.

Figure 13: Projections of Dairy Farming Viability

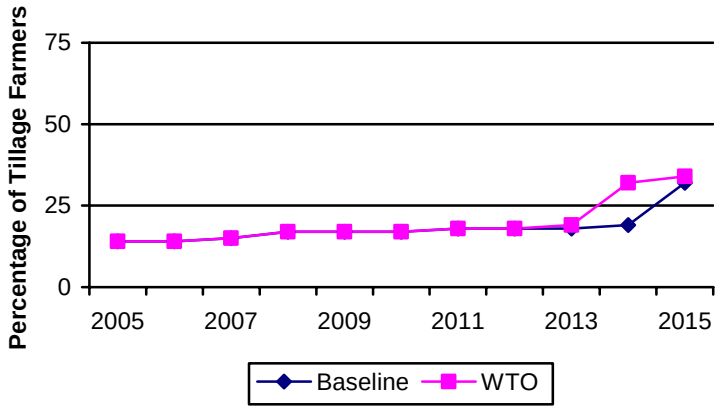


6.3: The Outlook for Tillage Farms

The RERC-FAPRI farm level modelling system is applied to NFS data on specialist tillage farms to simulate the effect of a WTO reform. IN 2004, there are approximately 120 observations representing approximately 7,4000 farms nationally. The implications of the WTO reform for farm income, the number of part-time farms and the overall composition of the specialist tillage farming population are considered. It is important to note here that in addition to the policy reform associated with WTO negotiations this sample of the farming population is also subject to changes in the Common Market Organisation (CMO) for sugar during the projected time period. Hence, following the decision to close the only remaining sugar processing plant in Ireland in early 2005, the ensuing projections for the composition of the tillage farming population reflect the consequent effect on family farm income ensuing form this decision.

The issue of 'sofa' or entitlement farming in the context of tillage farming is somewhat different from the discussion mentioned above for the cattle farming population. The analysis for the cattle farming population showed that the extent of such farming practices was likely to be quite low as the vast majority of farmers were in a position to operate some business in a profitable capacity when measured in gross margin terms. However, for the tillage farming population payments were partially decoupled from production under the Agenda 2000 reforms of the CAP, hence farmers already had the option to produce the cereal crop which produced the highest market based margin. As a result, when payments were fully decoupled form production the options available for the tillage farming population were not as varied as those available to livestock producers. Hence, the results in Figure 14 below which presents projections of the number of entitlement tillage farmers, that is farmers that are engaged in cereal farming in the base period but would maximise their farm incomes in the future by using their land only to collect their decoupled payment, are higher than those evident in the cattle farming sector presented previously in the paper.

Figure 14: Projections of the Number of Tillage Entitlement Farmers



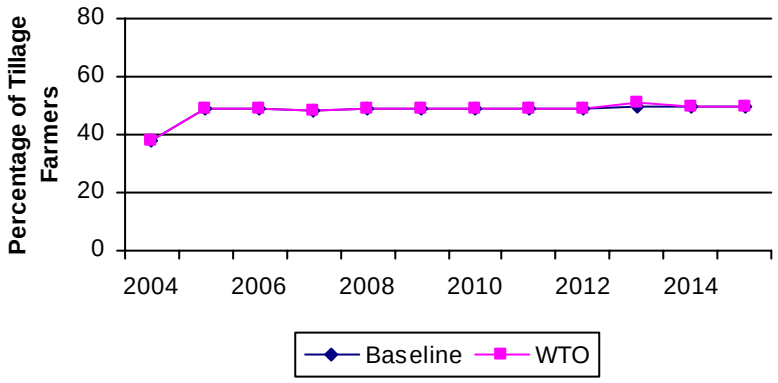
Source: RERC-FAPRI Farm-Level Model (2006).

Figure 14 shows that in the baseline scenario 14 percent of tillage farmers would financially benefit by becoming 'entitlement' or sofa farmers in 2005 and this figure rises to 32 per cent in 2015. Furthermore, in the WTO scenario the projected number of entitlement tillage farmers rises to 35 percent of the tillage farming population buy 2015. The main reason why the number of entitlement farmers increases over the period is because of the increasing costs and consequent declining margins associated with cereal production over the period.

Similar to the situation presented above for the cattle farming population, the entitlement farmers in the tillage sector also tend to farm a smaller area (42 hectares) than average (59 hectares). The farmers in this category will have the option to lease out their land in both the baseline and WTO scenario or alternatively to consider alternative land uses, such as conversion to low intensity livestock production such as summer grazing. Moreover, in recent times alternative land uses discussed especially in the context of the arable farming sector, include biofuel production such as oilseed rape, short rotation coppice willow and miscanthus production.

In addition to entitlement farming and the consideration of alternative land uses, the allocation of farmers' labour between farm work and off farm employment is also an important issue for tillage farmers. Given that a large number of tillage farmers will not be producing sugar beet in the future which traditionally has been viewed as a relatively labour intensive crop compared to some other tillage crops, the issue of off-farm labour allocation must be considered carefully. According to NFS data, 38 per cent of tillage farmers had an off farm job in 2004 and the estimated participation levels in off-farm employment by the operator until 2015 under the baseline and the WTO scenario are presented in Figure 15 below. The factors influencing participation rates and the econometric model used are identical to those outlined above for the cattle sector.

Figure 15: Projections of Participation in Off-farm Employment by Tillage Farmers

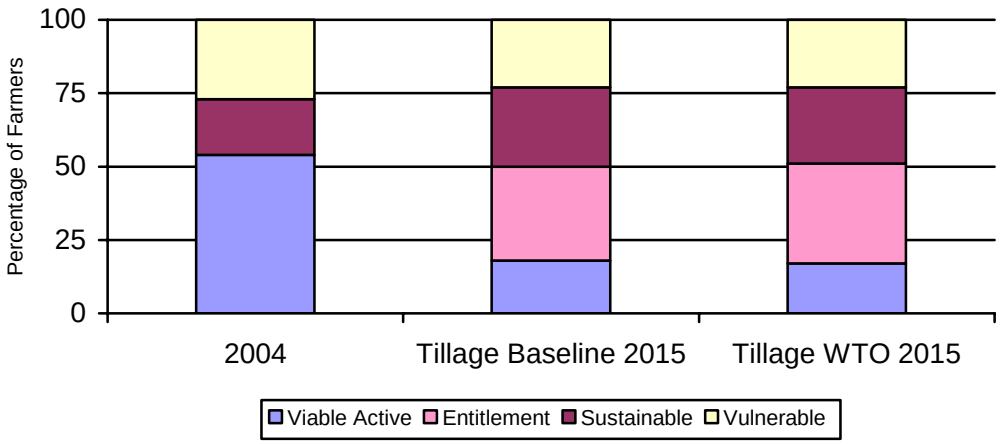


Source: RERC-FAPRI Farm-Level Model (2006).

Figure 15 shows that a substantial increase in the number of farmers likely to seek employment off the farm occurs directly after decoupling. As was evident in the cattle sector this result can be attributed to the decoupling of direct payments and the ensuing decline in the return on on-farm labour. Under the baseline scenario the number of farm operators seeking work off farm is is estimated at 50 percent by 2015. There is no further increase in the numbers projected to seek off-farm employment under the WTO scenario; hence the estimated number seeking off farm work remains at 50 percent by 2015.

To summarise the projected impact of the reform on the tillage farming sector the projected composition of the farming population is shown in Figure 16.

Figure 16: Composition of Tillage Farming Population – 2004 and 2015



Source: RERC-FAPRI Farm-Level Model (2006).

Figure 16 shows that in 2004 just over 1 in every 2 tillage farms were classified as being economically viable. However, the number of economically viable tillage farming businesses is projected to fall further overtime. Declining coupled returns to production emanating from increasing costs, declining cereal prices and the demise of the sugar beet industry reduces the returns to resources invested in tillage farming relative to labour employed elsewhere in the economy. According to the RERC-FAPRI farm level model, by 2015 the number of economically viable tillage farming businesses will have more than halved, with just under 1 in every 5 tillage farming businesses projected to be viable in the baseline and in the WTO reform scenario.

In addition to viable active tillage farmers the composition of the tillage farming population post decoupling includes entitlement farmers. The percentage of farmers engaged in entitlement farming is just slightly higher under the WTO scenario (34 percent of the population) than the baseline (33 percent of the population) which is a result of the slightly lower market based returns in the tillage farming sector in the WTO scenario versus the baseline position of no policy change. The number of sustainable farm households increases over time and by 2015 just over 1 in every 4 tillage farm households are projected to participate in off-farm work in order to make the household sustainable in the medium term. Finally, the number of vulnerable farm households, that is households that do not operate an economically viable farm business and neither farmer nor spouse has an off-farm income, declines over time as more farmers opt to work off the farm or switch into entitlement farming.

7. Summary and Conclusions

This analysis considers the effects of a possible WTO policy reform for farming in Ireland. The results suggest a bleak future for farming in Ireland following the policy reform, with the number of viable farms projected to decline significantly, the number of farmers unable to produce a positive market return on their land to increase as well as the number of farm households relying on income from outside the sector. The findings present a serious challenge for policy makers and for those involved in planning for the future of Irish agriculture or developing a new model of Irish agriculture that can be sustainable in an era of free trade. However, this analysis has not considered the role that technology can play in equipping farmers for this era of free trade. Furthermore, it is clear that costs will need to be managed more carefully and a significant amount of rationalisation will be required if farmers are to succeed in this new policy environment. Consequently, consideration must be given to the mobility of resources in this new policy environment to determine whether or not farmers will be able to face the challenges of free trade by increasing scale of production. Research is necessary to determine the potential availability of factors of production, such as land, labour, milk quota and other necessary resources, for those who are committed to pursuing a career in farming.

In addition, if the financial and policy incentives in farming are to change as a result of a WTO reform, additional questions need to addressed regarding the availability of the technology and knowledge for

farmers to switch to different production systems that are more akin to the new economic and policy environment. For instance, for the 13 percent of cattle farmers and 35 percent of tillage farmers that are projected to be better off becoming entitlement farmers by 2015, what is the potential for this segment of the farming population to look at alternative land uses such as biofuel and biomass production. For farmers wishing to switch to part-time farming or to exit production completely, questions relating to the employment opportunities and/or training opportunities for them in their local area need to addressed.

In conclusion, it seems that this analysis raises more questions than it has answered and clearly there is large scope for further research. This initial research however, does suggest that Irish farmers are still highly reliant on export subsidies and import tariffs and that any erosion of these supports to agriculture is likely to cause significant restructuring in the farming sector.

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