

Outlook 2017

Economic Prospects for Agriculture

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Summary Review of 2016



Global Economy

- Surprise decisions by voters in UK and US
- Brexit creates problems for EU
- Sterling depreciation
- Uncertainty ahead

Average Family Farm Income 2016



- Lower margins offset by higher support payments

Margins (relative to 2015)

- **Dairy** - down mainly due to lower milk prices
- **Beef** - down mainly due to lower beef prices
- **Sheep** - up slightly due to lower costs
- **Tillage** - down mainly due to lower yields
- **Pigs** - up due to higher pig prices and lower costs

Support Payment (relative to 2015)

- Up significantly due to full rollout of BPS and GLAS



Input Costs

Continued to fall. Reductions in fertiliser and fuel partially offset by increases in some other cost items



Fertiliser Prices

Significant drop as year progressed relative to 2015 level



Feed Prices

Steady in 2016 due to successive good global harvests



Oil Prices

Continued to remain at lowest level for almost a decade



Food Demand

Mixed picture, with stronger demand for meats and grains and weaker demand for dairy



Eurozone inflation

remains very low



Irish Unemployment

fell below 8%



Weather conditions

a reasonable year for grass growth, but challenging for tillage

Summary of Prospects for 2017



Global Economy

- Mixed economic picture continues
- Weak sterling due to negative view on UK growth prospects
- Euro to remain weak against US dollar and aid competitiveness
- Continuing growth prospects in emerging economies

Margins (relative to 2016)

- **Dairy** - Up due to higher price and volume
- **Beef** - Down due to lower prices
- **Sheep** - Stable with aid of payments
- **Tillage** - Up due to higher prices
- **Pigs** - down due to lower prices

Average Family Farm Income 2017



Input Costs

Slight upward pressure on some input prices



Fertiliser Prices

down on the 2016 level



Feed Prices

Slightly higher towards end of 2017



Oil Prices

Begin to move upwards, but still low compared to recent highs



Food Demand

Mixed picture, with recovery in dairy demand and weak demand growth for beef



Eurozone inflation

Remains very low



Irish Unemployment

to fall to 7%



Weather conditions

Normal weather assumed

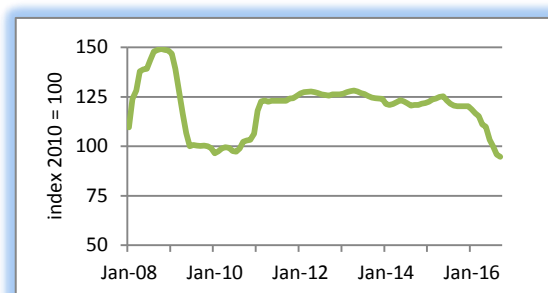
Overall Sector: Summary Review of 2016

Output Value	Input Spend	Support Payments	Income
↓ Down	↓ Down	↑ Up	→ Unchanged

- Weather conditions in 2016 were not as favourable to production as in either of the two preceding years. While grass growing conditions were reasonable, conditions for cereal production were more difficult.
- Lower input expenditure has been a feature of all of the grassland enterprises in 2016, driven by lower levels of fuel and fertiliser prices.
- Milk producers experienced close to a 4 cent per litre decrease in output prices in 2016, with prices falling to 27 cent per litre. Nevertheless, Irish milk production is estimated to have expanded by a further 5 percent in 2016.
- In 2016 low milk prices eroded some of the benefit of increased production and lower input costs, with dairy net margin per litre falling by 27 percent to 7.2 cent.
- Prices of finished cattle in 2016 fell 5 percent due to strong supplies and the impact of the collapse in sterling. Price of weanlings and store cattle decreased by 8 percent relative the 2015 level.
- Taking account of the fall in costs of production and the introduction of the Beef Data Genomics Programme payment, gross margins on the single suckling enterprise remained in line with the 2015 level.
- Gross margins on the cattle finishing enterprise declined by 3 percent in 2016.
- Sheep farmers saw their margins improve in 2016 by about 3 percent, as their costs of production decreased and lamb prices on average were relatively unchanged on the 2015 level.
- Irish cereal yields for major crops were down on the 2015 level. However, a large global harvest has meant that the low cereal prices of 2015 have persisted into 2016.
- Cereal direct costs fell slightly in 2016, but this was insufficient to counteract the effect of the drop in yields and cereal prices. As a consequence cereal margins fell considerably.

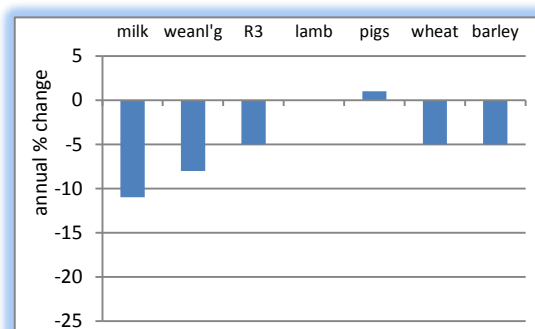
- Pig producers saw a year of two halves. Lower prices in the first of 2016 were counteracted by higher prices in the second half, due to strong international demand from China. This left pig prices for 2016 relatively unchanged on the 2015 level.
- A slight decrease in pig feed prices was the basis for a slight decrease in pig production costs in 2016, leading to a small improvement in margins from pig production.

Figure E1: Index of Monthly Irish Fertiliser Price







Source: CSO

Figure E2: Change in Output Prices 2016 vs 2015



Source: Authors' estimates

Overall Sector: Outlook for 2017

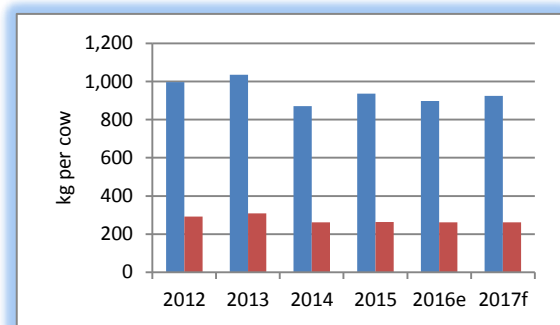
Output Value	Input Spend	Support Payments	Income
 Down	 Up	 Up	 Up

- The outlook for 2017 for the Irish agriculture sector as a whole is conditioned by the assumption that normal weather prevails.
- With normal weather there should be little change in feed bills in 2017 for all grassland enterprises, with the exception of dairy farms that are continuing to expand, where there may be some increase in feed use.
- Fertiliser prices may begin to move upwards in 2017, but will begin the year substantially lower than 12 months ago. With relatively stable fertiliser usage, there should be a fall in fertiliser expenditure for grassland systems and particularly for tillage systems in 2017.
- Pig producers should see relatively stable feed costs in 2017.
- A rise in fuel prices is forecast in 2017, as oil price are likely to increase. Electricity prices should remain stable.
- Irish milk prices should average about 20 percent higher in 2017 relative to 2016, as global supply growth is expected to be slow in the first half of 2017. Production costs should increase slightly.
- Irish beef prices are forecast to decline significantly in 2017, due to strong supplies across the EU and the weakness of sterling.
- Costs of production for beef are forecast to be largely stable. This is expected to lead to lower margins on both single suckling and cattle finishing enterprises.
- Sheep prices are expected to decrease by about 5 percent in 2017. Although production costs are forecast to rise, the Sheep Welfare Payment should a drop in sheep margins.
- Stock levels on international grain markets remain plentiful following successive strong global harvests. Cereal prices at harvest in 2017 will be highly dependent on growing conditions globally.
- On the assumption that global yields revert to normal, global supply and stock levels in 2017

are not forecast to increase over the 2016 level. Cereal prices are forecast to improve slightly relative to 2016.

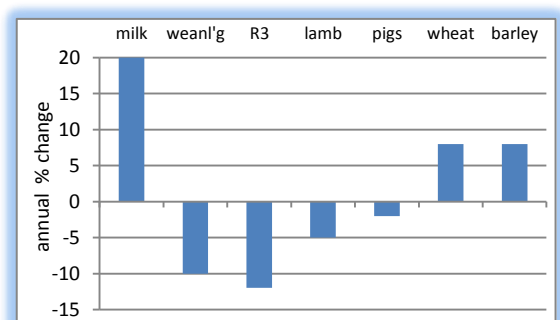
- Overall costs on cereal farms look set to fall as farmers benefit from lower fertiliser prices. With yields reverting to normal levels, margins for most crops in 2017 will improve on the 2016 levels.
- Pig meat prices are forecast to fall slightly in 2017. With little change in feed prices in 2017, a small drop in margins is forecast.

Figure E3: Dairy and Beef Feed Use 2012 – 2017



Source: Authors' estimates derived from DAFM and CSO data
Note: e = estimate f= Forecast

Figure E4: Forecast Change in Output Prices 2017 vs 2016



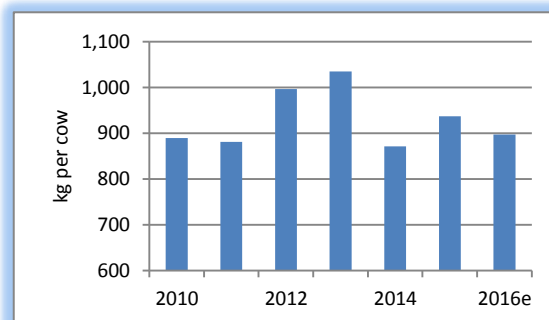
Source: Authors' forecasts

Dairy: Review of 2016

Output Value ↓ Down	Input Spend ↓ Down	Income ↓ Down
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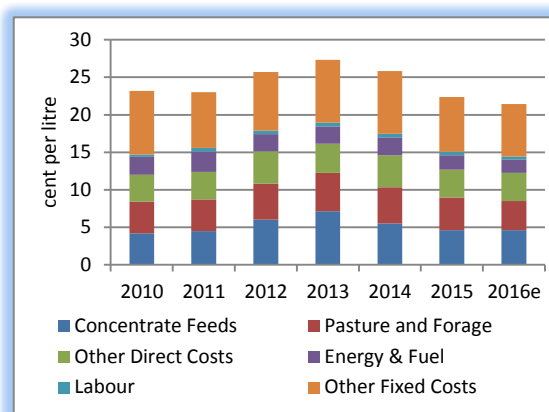
- Irish milk prices continued to decrease in the first half of 2016, reflecting the depressed world market situation. A recovery began in the second half of the year, but was too late to benefit milk prices in peak season.
- As a result, the annual average national milk price for 2016 is estimated to have fallen by 11 percent to an average of 27 cent per litre (CSO actual fat and protein).
- In response to low milk prices, the European Commission issued a milk supply reduction package worth €150m across the EU.
- It is estimated that aggregate Irish milk production increased by 5 percent in 2016.
- On a per cow basis, dairy feed usage is estimated to have decreased slightly in 2016.
- Decreased feed usage, combined with stable feed prices, and higher milk production, resulted in a marginal increase in dairy feed expenditure in 2016 on a per hectare basis, but a reduction of 2 percent on a per litre basis.
- Fertiliser use was little changed in 2016, in comparison with 2015, but prices fell substantially. This is estimated to have resulted in a 7 percent drop in pasture and forage costs on a per hectare basis and an 11 percent reduction on a per litre basis.
- Total milk production costs are estimated to have declined in 2016 on a per hectare basis by 3 percent, with a 7 percent decline recorded on a per litre basis (to 20.93 cent per litre), owing to increased milk production and the dilution effect it has on overhead costs.
- The reduction in production costs and increase in milk production was insufficient to offset the decline in milk price and it is estimated that the net margin per litre of milk produced declined to 7.2 cent per litre (down 27 percent) in 2016.
- With an assumed 3 percent increase in milk production per hectare, it is estimated that the net margin per hectare decreased to a national average of €795.

Figure E5: Irish Dairy Cow feed use 2010 to 2016



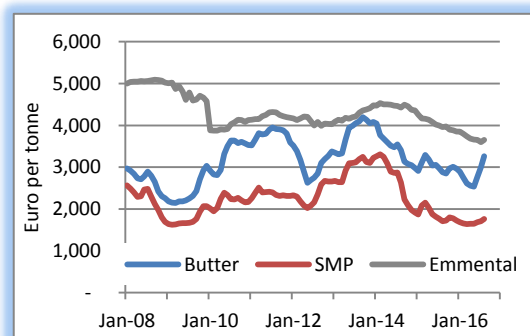
Source: FAPRI-Ireland (adapted from DAFM and CSO data) 2016 figure is an estimate

Figure E6: Average Total Milk Production Costs (cent per litre) in Ireland: 2006 to 2016



Source: Teagasc National Farm Survey and Authors' Estimate

Figure E7: European Dairy Product Prices



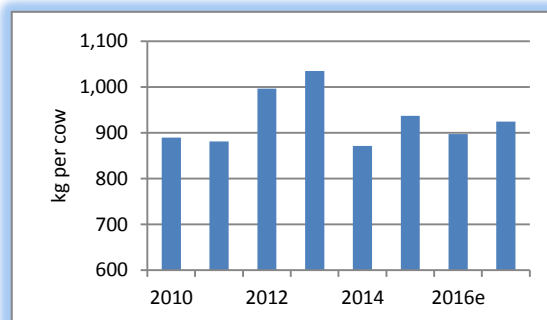
Source: USDA

Dairy: Outlook for 2017

Output Value	Input Spend	Income
Up	Up	Up

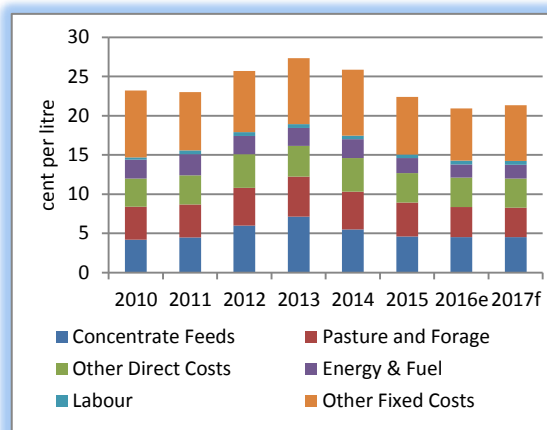
- Dairy markets are expected to continue to recover into 2017. It is forecast that the annual average milk price will increase by 20 percent in 2017 relative to the 2016 level, bringing the annual average milk price to 32.2 cent per litre (CSO actual fat and protein).
- Assuming normal weather conditions in 2017, feed expenditure on dairy farms is expected to increase marginally, particularly on farms that are expanding production.
- Fertiliser prices are expected to drop 5 percent as early season prices should be lower than in the same period in 2016. However, this price reduction may be offset by higher usage, leaving overall fertiliser expenditure relatively unchanged in 2017.
- Fuel prices are forecast to rise by 10 percent.
- Further growth in Irish national milk production is forecast in 2017. Following the estimated 5 percent increase in production in 2016, further growth of 6 percent is forecast in 2017.
- With increased national milk production of 6 percent, costs per hectare are forecast to increase by 5 percent, while costs on a per litre are forecast to increase by 2 percent, to an average of approximately 21.35 cent per litre.
- On a per litre basis, net margins are forecast to increase by 73 percent in 2017 relative to the 2016 levels, to an average of 12.4 cent per litre.
- Farmers expanding production are assumed to benefit from some economies of scale. Based on a milk production increase of 6 percent, the forecast net margin increases by 78 percent to an average of €1,413 per hectare.

Figure E8: Irish Dairy Cow feed use: 2010 to 2017



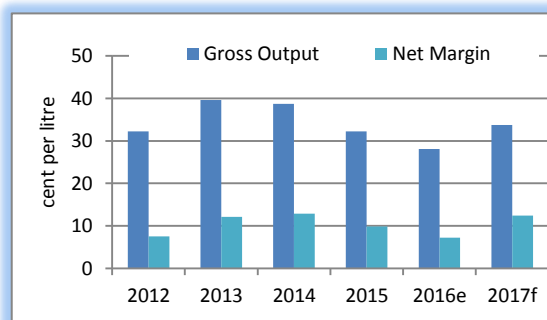
Source: FAPRI-Ireland (adapted from DAFM and CSO data) 2016 figure is an estimate and 2017 figures is a forecast

Figure E9: Average Total Milk Production Costs (cent per litre) in Ireland: 2010 to 2017






Source: Teagasc National Farm Survey, Authors' Estimate for 2016 and Author's Forecast for 2017

Figure E10: Dairy Gross Output and Net Margin



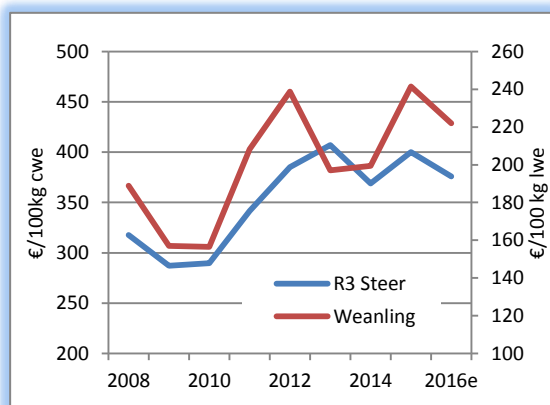
Source: Teagasc National Farm Survey, Authors' Estimates for 2016 and Authors' Forecast for 2017

Cattle: Review of 2016

Output Value	Input Spend	Income
 Down	 Down	 Down

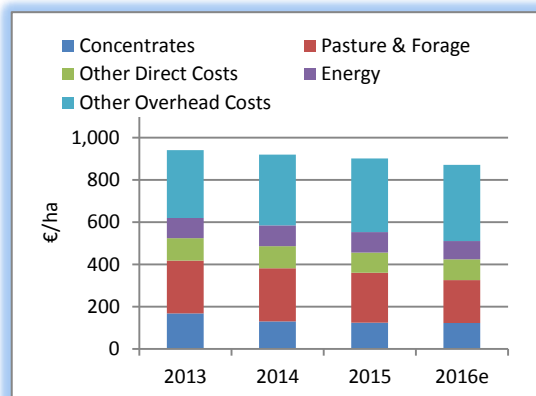
- In 2016 finished cattle prices declined by 5 percent relative to 2015, while prices of weanlings and store cattle decreased by an average of 8 percent.
- Negative price trends for all categories of cattle in 2016 have led to lower output value on both Single Suckling and Cattle Finishing enterprises.
- Lower fertiliser prices have led to lower expenditure on pasture and forage, with most other direct costs unchanged compared to 2015.
- The decrease in costs of production has mitigated the negative impact of lower output value on gross margins per hectare, on both Single Suckling and Cattle Finishing enterprises.
- In 2016 the average gross margin per hectare earned on Single Suckling enterprises is estimated to have remained stable at €466 per hectare. The receipt of payments related to the Beef Data Genomics Programme in 2016 has effectively prevented margins from declining.
- Cattle Finishing enterprise output value also declined in 2016 and gross margin is estimated to be €448 per hectare in 2016, 3 percent down on the 2015 level.

Figure E11: Finished Cattle and Young Cattle Prices



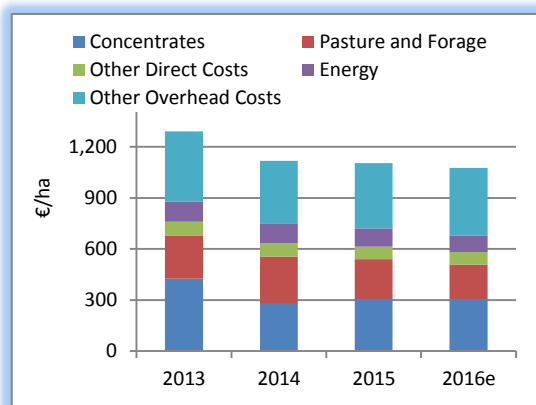
Source: 2007-2015 DG Agri, CSO, 2016 Authors' estimate

Figure E12: Costs of Production Single Suckling (SS)



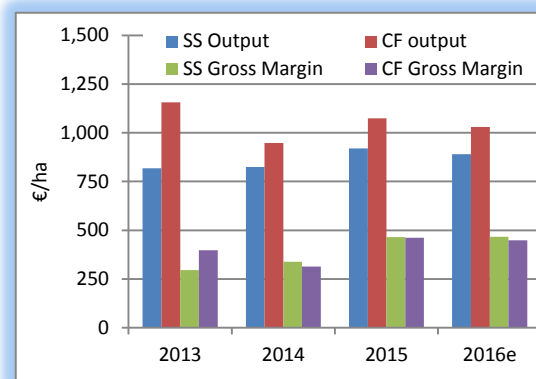
Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate

Figure E13: Cost of Production Cattle Finishing (CF)






Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate

Figure E14: Output and Gross Margin



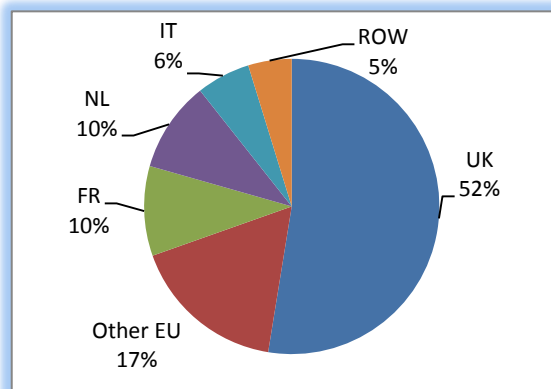
Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate

Cattle: Outlook for 2017

Output Value	Input Spend	Income
 Down	 Down slightly	 Down

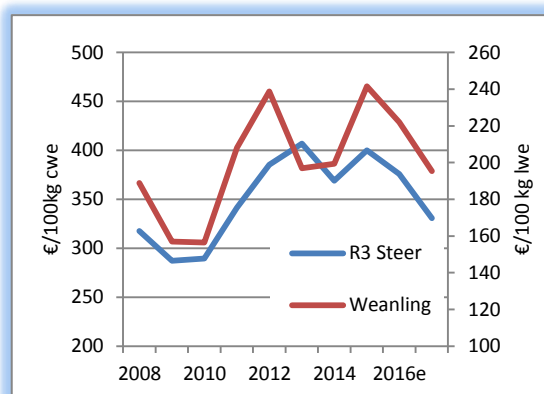
- EU supplies of beef are forecast to grow in 2017.
- Global beef markets in 2017 are forecast to weaken, with EU imports expected to remain stable and world prices expected to decline.
- The UK remains Ireland's most important beef market.
- The Brexit referendum result and depreciation of the pound sterling against the euro has created an immediate competitiveness challenge for the Irish beef industry.
- The forecast for Irish finished cattle prices is a 12 percent reduction in 2017 relative to the 2016 level.
- Young cattle prices are forecast to also decline, with prices up to 10 percent lower than in 2016.
- Input volumes on a per hectare basis in 2017 are forecast to remain largely unchanged on the 2016 level.
- Fertiliser prices are forecast to decline with most other input prices forecast to change only marginally.
- Direct costs of production on Single Suckling and Cattle Finishing enterprises are forecast to decrease by approximately 1 percent.
- With lower output values, as a result of the forecast contraction in cattle prices and only marginally lower direct costs of production, changes in margins on Single Suckling and Cattle Finishing enterprises in 2017 are forecast to be significantly negative.
- In 2017 gross margin per hectare on Single Suckling enterprises is forecast to decline by 14 percent to €402 per hectare. The negative impact of lower cattle prices on margins is moderated by receipt of coupled nationally financed direct payments under the Beef Data Genomics Programme.
- Lower young cattle prices moderate the impact of lower finished cattle prices to leave forecast gross margins on Cattle Finishing enterprises 19 percent lower at €364 per hectare.

Figure E15: 2016 Irish Beef Export by Volume



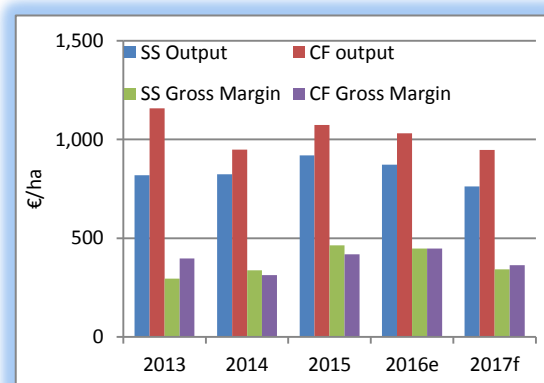
Source: Eurostat COMEXT (year through August)

Figure E16: Forecast 2017 Cattle prices



Source: Authors' forecast

Figure E17: Single Suckling (SS) and Cattle Finishing (CF) Output and Gross Margin per ha



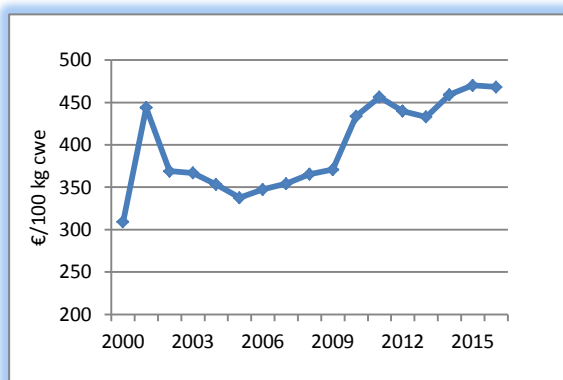
Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate, 2017 Author's forecast

Sheep: Review of 2016

Output Value ↑ Up Slightly	Input Spend ↓ Down	Income ↑ Up Slightly
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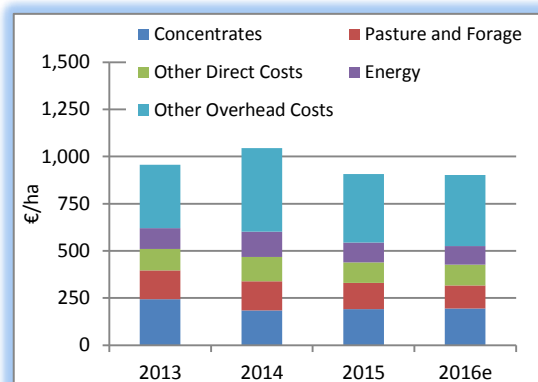
- The growth in demand and supply of sheep meat in the EU in 2016 was largely balanced and this helped limit changes in EU lamb prices.
- European lamb market prices in 2016 were marginally lower than in 2015.
- 2016 lamb prices in Ireland are also estimated to have been slightly lower than in 2015.
- Costs of production for Irish mid-season lowland lamb enterprises declined marginally in 2016 due mostly to changes in pasture and forage costs.
- Gross margins per hectare for Irish mid-season lowland lamb producers are estimated to have increased in 2016 due to lower input costs and small improvements in output volume due to higher average lamb slaughter weight.
- In 2016 gross margins on mid-season lowland enterprises are estimated to be €545 per hectare.

Figure E18: Irish Sheep price with estimate for 2016



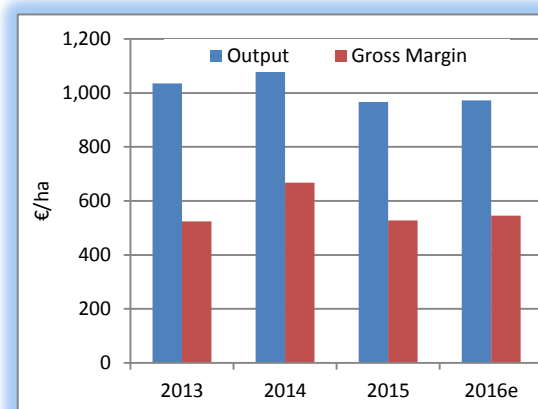
Source: 2000-2015 DG Agri; 2016 Authors' Estimate

Figure E19: Average Sheep production costs 2013-2015 and estimate for 2016



Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate

Figure E20: Average Sheep output & margin estimate for 2016



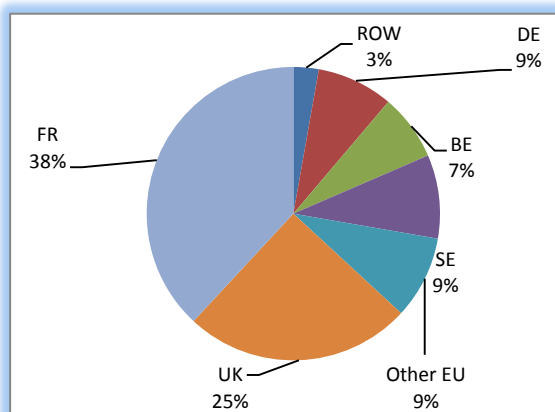
Source: 2013, 2014 & 2015 Teagasc NFS, 2016 Author's Estimate

Sheep: Outlook for 2017

Output Value ↓ Down	Input Spend ↓ Down Slightly	Income ↑ Up
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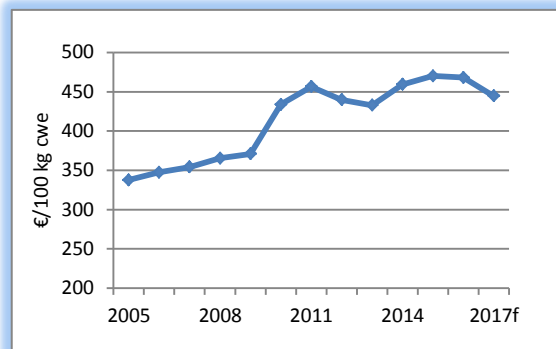
- The outlook for Irish and EU lamb prices for 2017 is negative.
- Tight global supplies of mutton and lamb are forecast for 2017, due to contraction in New Zealand production and rebuilding of sheep flocks in Australia.
- Despite increasing global prices and stable EU production, exchange rate developments and lower beef prices are forecast to leave EU and Irish lamb prices lower than in 2016.
- Sheep feed expenditure is forecast to be stable.
- Fertiliser prices are forecast to decline relative to the average prices level in 2016. With fertiliser usage unchanged, pasture and forage costs are expected to decline in 2017.
- With slightly lower costs of production in 2017 and lower output value, gross margins for mid-season lowland lamb enterprises in 2017 would be expected to decline.
- However, the introduction of a coupled sheep welfare payment scheme in 2017 is forecast to lead to a small increase in gross margins from mid-season lowland lamb production.
- In 2017 the average gross margin per hectare earned by Irish midseason lowland lamb enterprises is forecast to increase to €568 per hectare.

Figure E21: 2016 Irish Lamb Exports by Volume



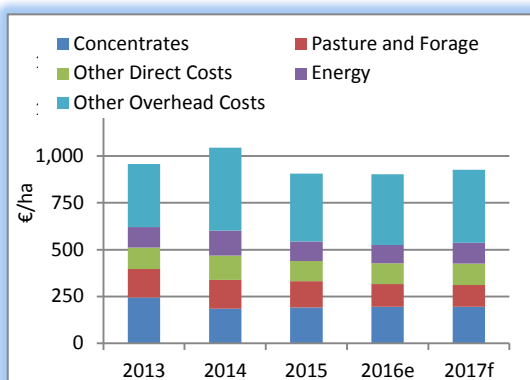
Source: Eurostat COMEXT (year to end of August)

Figure E22: Sheep price forecast for 2017



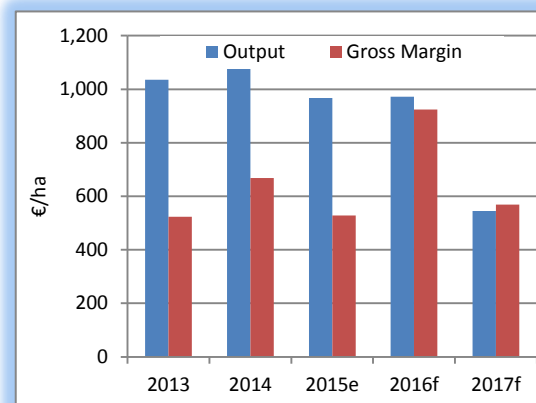
Source: 2005-2015 DG Agri; 2016 Authors' Estimate; 2017 Authors' forecast

Figure E23: Sheep production costs 2017 forecast



Source: 2013-2015 Teagasc NFS, 2016 Authors' Estimate, 2017 Authors' Forecast

Figure E24: Average Sheep output & margins with forecast for 2017



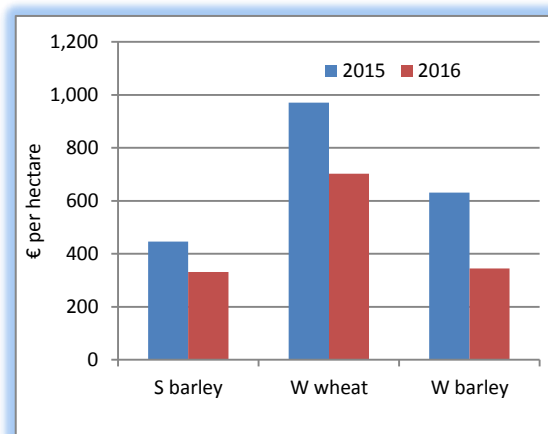
Source: 2013-2015 Teagasc NFS, 2016 Authors' Estimate, 2017 Authors' Forecast

Cereals: Review of 2016

Output Value ↓ Down	Input Spend → Unchanged	Income ↓ Down
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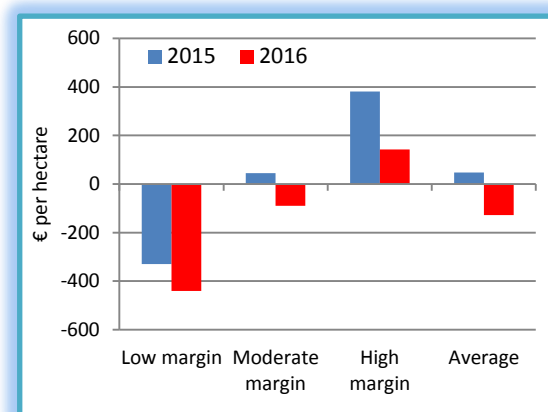
- Improved cereal yields across the key growing regions of the world, led to a further increase in stock levels worldwide. Grain prices declined in 2016 as a result.
- Relatively low prices were coupled with a decline in Irish yields of the main cereal crops in 2016. For example, spring barley yields decreased by 0.6 tonnes per hectare, while winter wheat yields decreased by 1.3 tonnes per hectare, compared to 2015.
- Direct costs of production on Irish cereal farms decreased very slightly in 2016 compared to 2015. Fertiliser and fuel related costs on cereal farms witnessed the largest percent decrease, at 5 percent and 12 percent respectively.
- Increases in other cost components, such as crop protection, meant that direct costs of production decreased by about 1 to 2 per cent in 2016. Overall overhead costs remained more or less unchanged in 2016.
- The net effect of output value and input cost changes saw a decrease in the gross margins on all cereal crops in 2016. The gross margin for winter wheat is estimated to be down by €250 per hectare, while the margins for the other main crops, winter barley and spring barley, are estimated to be down by €250 and €100 per hectare respectively.
- There remains a wide variation in terms of the economic performance of individual cereal farms nationally. It is estimated that the average cereal enterprise on specialist tillage farms will return a negative market based net margin in 2016. But behind this average figure is a range, with the bottom 1/3 of farms earning a negative market based net margin of - €440 to the top 1/3 of farms earning €142 per hectare.
- Overall, there was a decrease in average market based net margin in 2016, relative to 2015, to - €130 per hectare. This can be attributed mainly to the decrease in prices and yields in 2016.

Figure E25: Gross Margin for Main Cereal Crops (2015 actual and 2016 estimate)



Source: Teagasc, National Farm Survey Data & Authors' estimate for 2016

Figure E26: Cereal Enterprise Net Margin on Specialist Tillage Farms (2015 Actual and 2016 estimate)



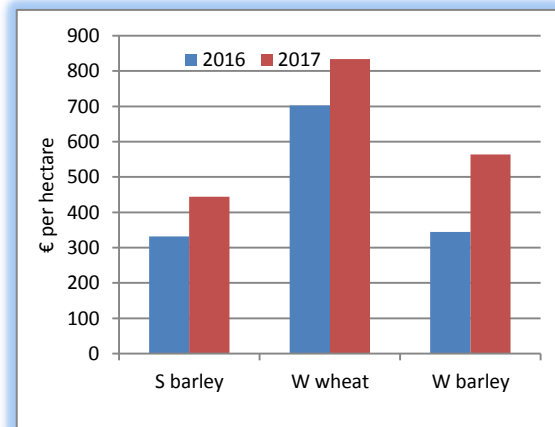
Source: Teagasc, National Farm Survey Data & Authors' estimates for 2016

Cereals: Outlook for 2017

Output Value ↑ Up	Input Spend ↓ Down	Income ↑ Up
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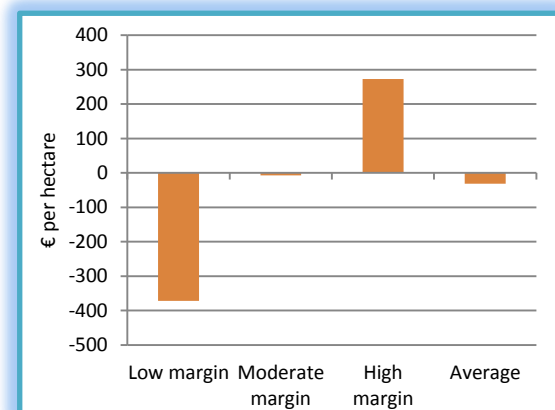
- World grain stocks have increased following two years of record harvests worldwide and this is likely to ease grain price volatility in the short term.
- In terms of market supply and demand, there does not appear to be anything evident that would suggest that prices will move dramatically before harvest 2017.
- Current (November 2016) futures markets indicate that 2017 harvest prices will be about 8 percent higher than 2016 harvest prices. This upward movement in prices can be explained by an expected reversion to trend yields in 2017.
- A return to trend yields in Ireland in 2017 would mean a mixed story in terms of yields achieved, with yields for some crops increasing and others decreasing.
- Direct costs of production on cereal farms are expected to decrease slightly in 2017, with key inputs such as fertiliser and seed expected to decline.
- However, movements in overhead cost items are expected to cancel out some of the gains made in direct cost items, with key fixed costs such as those related to fuel expected to increase.
- The net effect of the changes in output value and input expenditure, is that 2017 gross margins for most cereals are forecast to increase.
- The gross margins for spring barley and winter wheat are forecast to increase by over €100 per hectare, and winter barley is forecast to increase by over €200 per hectare in 2017.
- Cereal enterprise market based net margin on specialist tillage farms in 2017 is forecast to increase on the 2016 level. However, it is forecast that the average farmer will continue to make a negative market based net margin in 2017, losing €30 per hectare after all costs are paid.

Figure E27: Gross Margin for Main Cereal Crops (2016 estimate & 2017 forecast)



Source: Teagasc, National Farm Survey Data & Authors' estimate for 2016 & forecast for 2017

Figure E28: Cereal Enterprise Net Margin on Specialist Tillage Farms, 2017 forecast



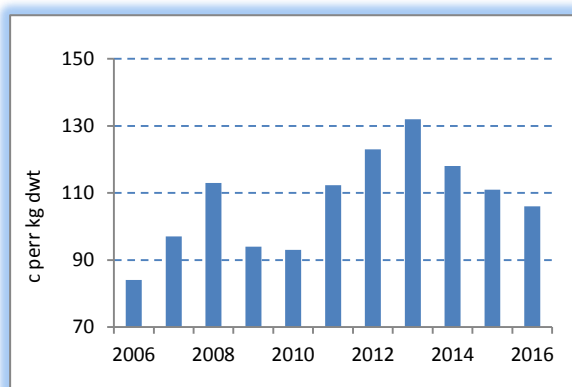
Source: Teagasc, National Farm Survey Data & Authors' forecast for 2017

Pigs: Review of 2016

Output Value ↑ Up	Input Spend ↓ Down	Income ↑ Up
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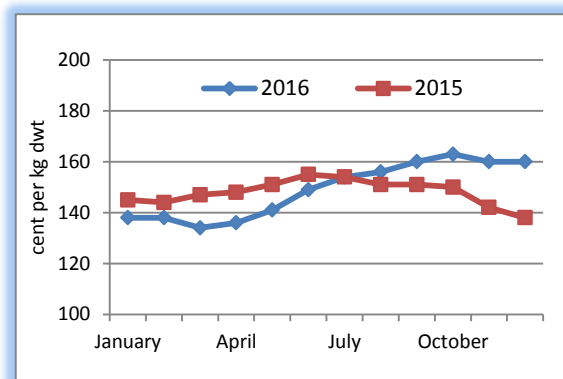
- The price of the main pig feed ingredients declined in 2016.
- The annual average feed cost in 2016 was 106 c/kg dwt, which was 4 per cent lower than 2015 and 10 per cent lower than the 5 year average of 117 c/kg dwt.
- The 2016 Irish pig price was virtually unchanged from 2015 (149 vs 148 c/kg). However, during 2016 there were large fluctuations, ranging from 134 to 164 c/kg.
- The estimated 2016 average pig price of 149 cent was significantly below the five year average (2012-2016) of 161 cent per kg.
- Weak prices in the first half of 2016 were due to increased European pig production, but improved exports to China in the latter half of the year significantly increased monthly prices.
- The 2016 'Margin Over Feed' per kg was 43 cent, but March had the lowest monthly margin (26c/kg) since 1999. When the 2016 margin over feed is compared to the average margin over feed of the last five, ten, fifteen and twenty years, the low profitability of recent years becomes clear.

Figure E29: Irish Compound Pig Feed Price 2006 to 2016



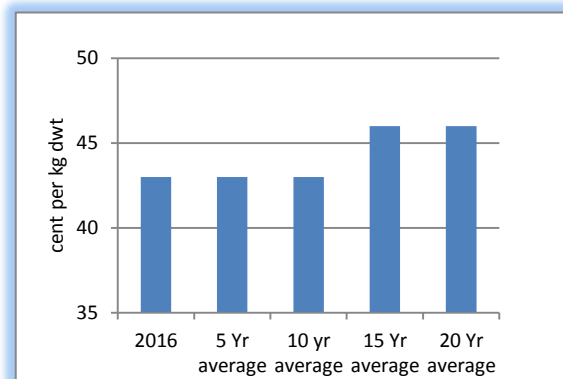
Source: Teagasc Pig Department

Figure E30: Monthly Irish Pig Prices 2015 - 2016



Source: Teagasc Pig Department
December 2016 figure is an estimate

Figure E31: Margin Over Feed: a Historical Comparison with 2016



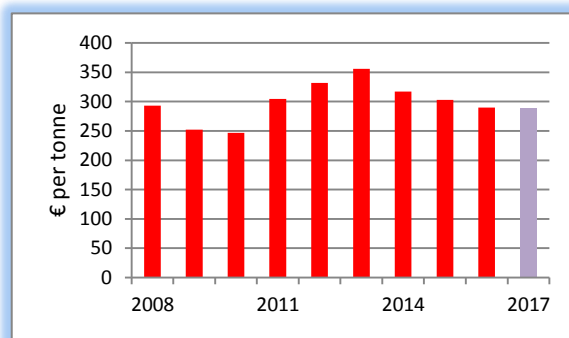
Source: Teagasc Pig Department

Pigs: Outlook for 2017

Output Value ↓ Down	Input Spend → Unchanged	Income ↓ Down
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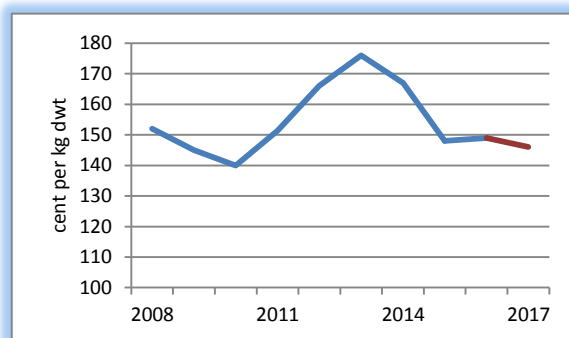
- The bumper harvests in 2014, 2015 and 2016 have resulted in a significant build-up of global cereal and soybean stocks.
- This is forecast to generate stable feed prices until mid-2017, where-upon harvest 2017 will dictate prices for the latter half.
- Forecasts for the South American soybean harvest suggest one of the largest harvests ever, with the Brazilian crop estimated to exceed 100 million tonnes for the first time.
- While this would suggest a fall in the 2017 soyabean prices, this may be offset by increased Chinese imports of 88 million tonnes and a weaker euro exchange rate.
- The outlook for 2017 is for the annualised composite pig feed cost to remain steady when compared to 2016 (at €290 per tonne).
- A stabilisation of the EU sow herd size and increased number of piglets born alive will increase the supply of European pigs. It is estimated this increase will be in the region of 2 percent.
- This forecast increase in the volume of pigs on the European market will lead to higher volumes of pigmeat production in 2017. This will result in a forecast annualised price decrease of 2 percent (to 146c/kg) in 2017.
- Two significant factors could influence the price in 2017; reduced Chinese pigmeat imports in the latter half of the year and an outbreak of African Swine Fever in a large mid-European pig producing country. Either of these possibilities would significantly affect the price outlook.

Figure E32: Historical Compound Pig Feed Price and forecast for 2017



Source: Teagasc Pig Department

Figure E33: Historical Irish Pig Prices and forecast for 2017 (c/kg dwt)



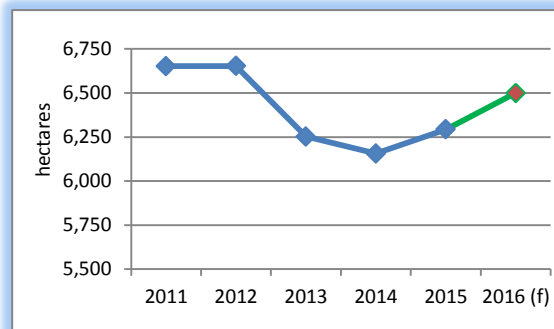
Source: Teagasc Pig Department

Forestry Sector: Review of 2016

Afforestation levels ↑ Up Slightly	Timber demand ↑ Up	Timber prices ↑ Up (1 st half)
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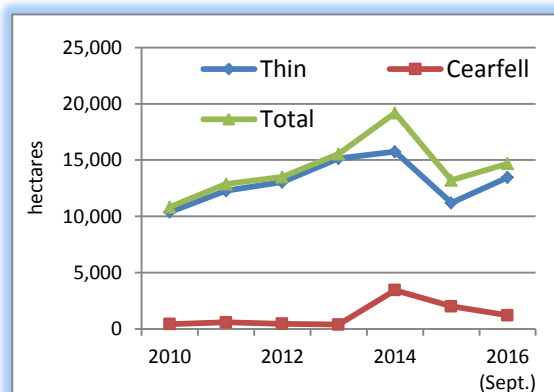
- Annual Irish afforestation figures are up, with 5,250 ha planted by September 2016. The end of year figure is expected to be 6,500 ha, exceeding the programme planting target for 2016 by 4 percent.
- Both Coillte & private timber prices fell throughout 2015, before recovering by 10 percent and 2 percent respectively up until the 2nd quarter of 2016. There remains a wide variation in timber prices according to factors such as region, forest type, harvest type, timber quality and access.
- Brexit related currency fluctuations have had a depressing effect on the price being offered by Irish mills in the 2nd half of 2016.
- The area licensed for thinning and clearfell in September, 2016 is already 11 percent higher than the 2015 total, albeit with a higher proportion of thinning licences issued.
- The overall net demand for roundwood/ wood fibre on the Island of Ireland was forecast to increase from 4.88 million cubic metres (m³) in 2015 to 5.17 million m³ by 2016, an increase of 6 percent.
- In 2015, consumption of sawn timber in ROI increased by 9.9 percent, driven by improvement in the construction markets, with house completions increasing by 15 percent to 12,666. A similar increase is expected by the end of 2016, with forecast house completions at 14,000 (10 percent increase on the 2015 figure).
- The timber sector remains very dependent on the export market, worth €335 million in 2015. A very high proportion (79%) of wood-based panels was exported (610,000 m³) to a value of €190 million. Key export markets are the UK and the Benelux countries.

Figure E34: Annual planting 2011 to 2015, with 2016 forecast (f)



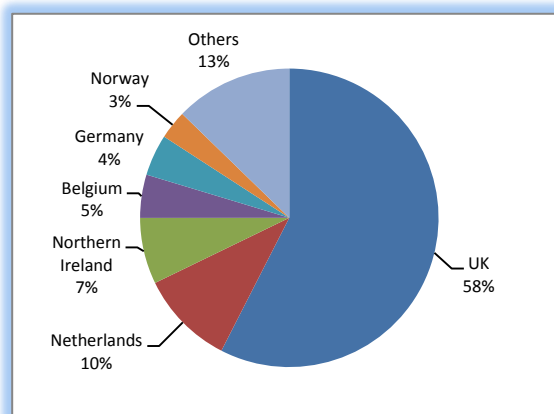
Source: Forest Service, various years

Figure E35: Area (ha) of felling licences issued for private forests, 2010-2016



Source: Forest Service, various years

Figure E36: Key export markets for panel products manufactured in Ireland (2011-2015)



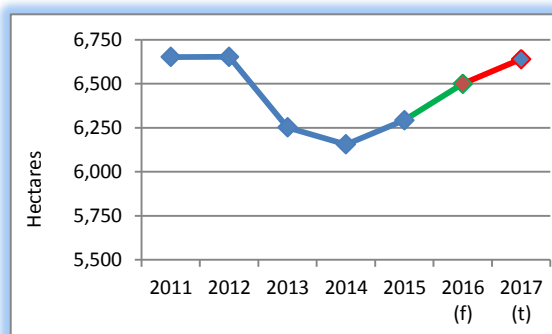
Source: EUROSTAT 2016 & Drima Market Research

Forestry Sector: Outlook for 2017

Afforestation levels ↑ Up Slightly	Timber demand ↑ Up	Timber prices ↓ Down
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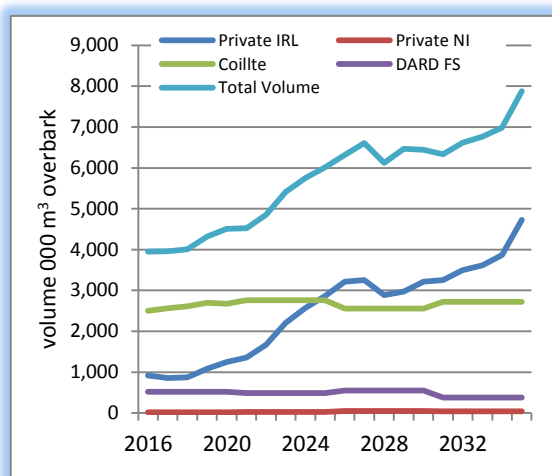
- The annual afforestation target is 6,640 ha for 2017, a 5 percent increase on the 2016 target and a 2 percent increase on the forecast end of year figure for 2016.
- Brexit related currency fluctuations are forecast to have a depressing effect on the price being offered by Irish mills in the 2nd half of 2016, and this situation is likely to continue into 2017.
- 2,021 general felling licenses (GFLs) have been issued to the end of September 2016 representing an area of 43,671ha, comprising both Coillte and private sector forestry. Licences are generally issued for a 5 year period utilisation, and not all felling will occur in the year that the licences are issued. It is anticipated that a higher proportion of thinning will occur in 2017.
- The overall net demand for roundwood/ wood fibre on the Island of Ireland is forecast to increase from 5.17 million cubic metres (m³) in 2016 to 5.48 million m³ by 2017, an increase of 6 percent.
- Forecasts indicate that the net realisable volume from the private sector will fall slightly from 976,000 m³ in 2016 to 914,000 m³ in 2017. Private sector volume production is predicted to increase steadily, reaching 1.32 million m³ in 2020 and 3.21 million m³ by 2026.
- House completions were forecast at 14,000 in 2016. There is a medium to long-term requirement to build approximately 25,000 housing units per annum nationally.

Figure E37: Annual planting 2011 to 2015, with 2016 forecast (f) & 2017 target (t)



Source: Forest Service, various years

Figure E38: Forecast of Total Net Realisable Volume Production to 2035 (000m³)



Source: All-Ireland Roundwood Production Forecast 2016-2035 (COFORD, 2016)

Irish Dairy Farming in 2015



Irish Milk Deliveries

6,395 million litres (up 13%)



Days at Grass

239 days (down 2%)



Milk Production per cow

average 5,384 litres (up 5%)



Stocking Rate

average of 2.03 lu/ha



Milk price (Teagasc NFS)

average 31 cent per litre (down 22%)



Milk Production per ha

average 10,755 litres (up 3%)



Irish Dairy Cow Numbers (Dec)

1.239 million (up 10%)



Milk Fat Content

average 4.03% (up 5 basis points)



Concentrate Fed/Dairy Cow

average 905 kg (down 5%)



Milk Protein Content

average 3.50% (up 7 basis points)



Concentrates fed/litre of milk

average 0.16 kg (down 16%)



Milk Solids per Cow

average 393kg (up 5%)



Nitrogen per ha of grassland

average 158 kg



Single Farm Payment per farm

€ 15,965



Total Production Costs

ave. 22.4 cent per litre (down 13%)

ave. €2,392 per hectare (down 9%)



Somatic Cell Count

ave. 180,000 cells/ml (down 19%)



Gross Margin for Dairy Enterprise

ave. 19.5 cent per litre (down 19%)

ave. €2,114 per hectare (down 15%)



Net Margin for Dairy Enterprise

























ave. 9.8 cent per litre (down 24%)

ave. €1,083 per hectare (down 19%)



























Source: Teagasc National Farm Survey and Central Statistics Office

Irish Dairy Farming in 2016

	Further fall in milk prices but further expansion in Irish milk production	
	Milk Production up 5% on the 2015 level	
	Milk price down 11% on the 2015 level	
	Weather Conditions Not as good as 2015	
	Grass Availability Good	
	Fertiliser Prices down 14% on 2015 level Fertiliser Use little changed on 2015 level	 
	Feed Prices unchanged Feed use down 5% per head	 
	Other Direct Costs up 4% on the 2015 level	
	Fuel prices down 14% on the 2015 level	
	Total Costs per litre of milk down 7% on the 2015 level	
	Net Margin for Dairy Enterprise down 27% per litre on 2015 level	

Irish Dairy Farming in 2017

	Recovery in milk prices market balance improves	
	Milk Production up 6% on the 2016 level	
	Milk price up 20% on the 2016 level	
	Weather Conditions Normal weather assumed	
	Grass Availability may not be as good as 2016	
	Fertiliser Prices down 5% on 2016 level Fertiliser Use little changed on 2016 level	 
	Feed Prices unchanged Feed use up 3% per head	 
	Other Direct Costs up 3% on the 2016 level	
	Fuel prices up 10% on the 2016 level	
	Total Costs per litre of milk up 2% on the 2016 level	
	Net Margin for Dairy Enterprise up 73% per litre on 2016 level	

Source: Teagasc Estimates for 2016 and Forecasts for 2017

Review of Dairy Farming in 2016 and Outlook for 2017

Trevor Donnellan

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1. Introduction

Despite a sharp decline in milk prices in 2015, the removal of the milk quota system along with weather conditions that were excellent, allowed for an increase in milk production of 13 percent at the national level. This increase in milk production limited the reduction that took place in average Family Farm Income (FFI) on dairy farms. In 2015 average FFI fell by 9 percent on the 2014 level.

Relative to feed prices, milk prices globally were high in the first half of 2015. This created an oversupply of dairy products in 2016 on global markets. Following the sharp decrease in dairy product prices in the second half of 2015, dairy product and milk prices continued to fall in the early months of 2016, with production growth running ahead of consumption growth, leading to a build up of stocks. Milk prices reached a low point in mid 2016 coinciding with the peak season for Irish milk production. To help alleviate the market imbalance, the EU introduced a voluntary supply control measure.

This most recent bout of dairy market weakness has persisted for longer than had been expected and the recovery only began in the second half of 2016, later than many had anticipated. At this point it appears that dairy product and milk prices are moving into shallow recovery, but the benefits of this recovery will not really be felt until 2017.

This paper looks back on dairy farm performance in 2015, reviews the outcome for 2016 and looks ahead to the prospects for 2017. Data from the Teagasc National Farm Survey (Teagasc NFS) are used in our review of 2015. The milk price and key input cost estimates for 2016 are used to produce an overall estimate of dairy enterprise margins for 2016. Finally, in the concluding sections of the paper, the forecast for milk price, production costs and dairy farm margins in 2017 are presented.

2. Review of the Economic Performance of Dairy Farms in 2015

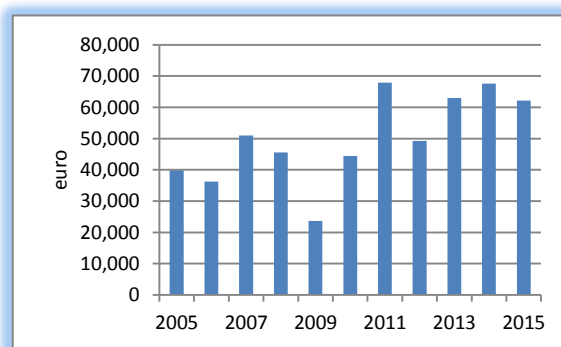
National Farm Survey results for 2015 were finalised in May 2016, and the results for dairy farms are

summarised here. To examine the economic performance of dairy farms in 2015, we first look at how dairy farm income has changed over the last number of years. Figure 1 presents the average Family Farm Income (FFI) on *Specialist Dairy* farms over the years 2005 to 2015.

Average FFI has been generally higher in the last five years than in the period 2005 to 2010. However, FFI has also been quite volatile in the more recent years. In spite of the increase in milk production in 2015, the average dairy farm FFI actually fell to €62,148 due to the decline in milk prices in 2015.

To further explore the economic performance of dairy farms in 2015, we next look at how margins have changed in the past few years. Table A1 (see appendix) presents the average gross output, gross margin and net margin per litre of milk produced in 2014 and 2015. Farms producing mainly liquid milk are excluded from the sample, as are herds of 10 cows or less.

Figure 1: Average Income on Irish Specialist Dairy Farms 2005 to 2015



Source: Teagasc National Farm Survey (various years)

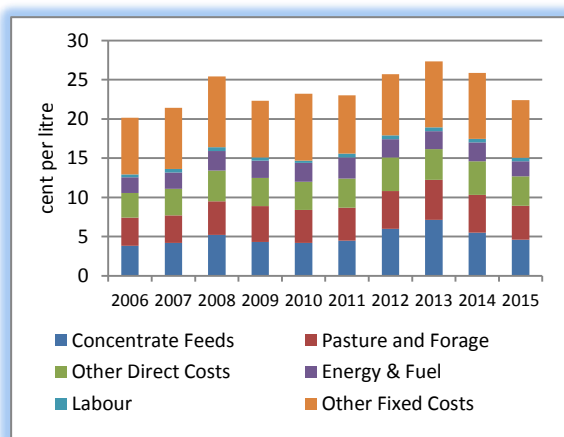
The gross output measure includes the value of milk and calf sales minus replacement costs. Gross output per litre decreased by 17 percent in 2015 relative to 2014, mainly due to the lower milk price. Total direct costs were down by 13 percent in 2015 compared to 2014, due mainly to lower feed and fuel costs. Fixed costs per litre also fell, partly due to the post milk quota increase in milk production which had a diluting effect on fixed cost items. As a

result, the average gross margin in 2015 decreased by 17 percent on a cent per litre basis relative to 2014. In 2015, total fixed costs decreased by 13 percent relative to 2014. The average net margin in 2015 was 9.82 cent per litre, representing a 24 per cent decrease on the 2014 level.

Table A2 (in the appendix) presents gross output, total costs and net margin per hectare of forage area allocated to the dairy enterprise for 2014 and 2015. Production per hectare increased by 3 percent in 2015, but overall net margin per hectare decreased by 20 percent, largely due to the fall in milk price.

The cost and margin data in Table A3 allow us to examine the variability in economic performance across dairy farms in 2015. Farms are classified on the basis of gross margin per hectare: the best performing one-third of farms (Top), the middle one-third (Middle) and the least well performing one-third (Bottom). On a per litre basis, production costs for the Bottom group (24.18 cent) are almost 16 percent higher than for the Top group (20.77 cent) and the net margin for the Bottom group (6.89 cent) is only about half of that of the Top group (12.52 cent). Compared with 2014 the spread in profitability between the average for the Top group and the Bottom group was narrower in 2015.

Figure 2: Total Milk Production Costs (cent per litre) in Ireland: 2006 to 2015



Source: Teagasc National Farm Survey Data

As shown in Figure 2, total milk production costs declined in both 2014 and 2015. The main drivers of this decline were reduced expenditure on concentrate feed, the fixed cost dilution effect associated with producing more milk and also an accounting adjustment which reduced the allocation of the overall fixed costs of the dairy farm to the dairy enterprise in 2015. Total production

costs per litre returned to levels last seen in 2009, with costs per litre in 2015, some 5 cents lower than at the peak reached in 2013.

3. Review of 2016 Estimated Performance

This section of the paper presents a review of dairying in 2016. Teagasc NFS results for 2016 will not be available until the middle of 2017. Therefore, it is necessary to estimate the price and volume of inputs and outputs in 2016, in order to assess the outcome for margins. The following section of the paper first discusses cost estimates for 2016, looking at both input prices and input usage volumes. Finally, the development of dairy product markets in 2016 in terms of both price and volume changes is discussed.

The discussion of production costs in 2016 is complicated by the fact that milk production at the overall national level has continued to increase significantly in 2016. One would imagine that this would have led to an increase in purchased inputs in 2016. However, the limited data on sales volumes that is available does not suggest that there has been much change in overall input usage in 2016 relative to 2015. The situation on individual farms may not mirror this overall national picture. This analysis cannot attempt to cover the experience on every farm in 2016.

3.1 Estimated Input Usage and Price 2016

It is not possible to offer a comprehensive assessment of likely changes in costs at the farm level in 2016, given that the post milk quota expansion strategy of the farm will itself influence the change in production costs, whether expressed on a per hectare or on a per litre basis. In this analysis of likely changes in production costs in 2016, it is assumed that the average farm increases its milk production by 5 percent in 2016.

3.1.1 Feedstuff – usage and price 2016

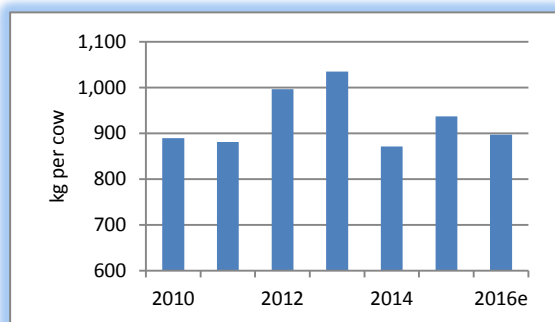
Purchased feed (concentrates) is an important element of dairy production costs in Ireland, typically accounting for about 20 percent of total production costs, although this varies by farm and by year.

While official aggregate feed sales data for the full year are not yet available, provisional data suggest that feed sales increased only slightly. Given that the dairy cows population is estimated to have

increased by 7 percent in 2016, this suggests that there has been a decrease in feed use per dairy cow in 2016. Weather conditions in 2016 have been generally favourable for grass growth, which suggests that the decrease in feed use may be attributable to low milk prices and a slight drop in milk yields per cow relative to 2015. The average milk yield per cow is estimated to have decreased by 2 percent in 2016 relative to 2015.

Figure 3 shows the average volume of compound feed use per cow, including an estimate for 2016. These data are derived from Department of Agriculture, Food and Marine (DAFM) figures on feed sales, from Central Statistics Office (CSO) data on animal numbers and estimates by the authors.

Figure 3: Compound Feed Purchases per Dairy Cow in Ireland: National Average for 2009 to 2016



Source: Author estimates derived from DAFM and CSO data
Note: e = estimate

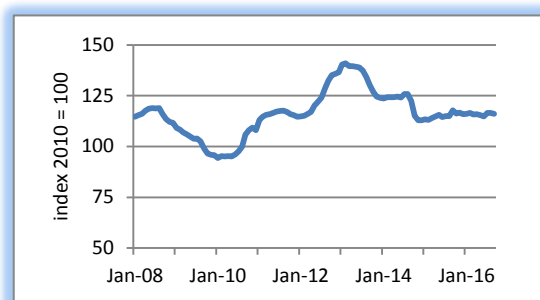
For the average dairy farm, expanding production by 5 percent in 2016, feed use per cow, estimated to be 897kg, is likely to 5 percent lower in volume terms than in 2015. It should be kept in mind that the feed usage on individual farms may differ from this aggregate story.

Weather conditions globally for cereal and other grain producers have been quite good in each of the last four years. Good harvests in these years have led to a rebuilding of global cereal stocks and generally lower international cereal prices. Internationally conditions were again quite good in 2016, further contributing to the recovery in stock levels. Accordingly, price on the Irish feed market held steady in 2016.

Figure 4 shows an index of monthly Irish cattle feed prices from 2008 to 2016. The annual average feed price for 2016 is estimated to be €282 per tonne, relatively unchanged on the average 2015 level. Stable feed prices in 2016, combined with a stable

volume of dairy aggregate dairy feed use, suggests that total expenditure on dairy feed in 2016 was unchanged in aggregate terms. However, in assessing feed use per litre, allowance must be made for the fall in feed use per head. On a per litre basis the expenditure on feed is estimated to have declined by 2 percent in 2016. Alternatively, feed costs on a per hectare basis are estimated to have increased by 1 percent on the average farm producing 5 percent more milk in 2016.

Figure 4: Monthly Price Index of Cattle Meal in Ireland 2008 to 2016

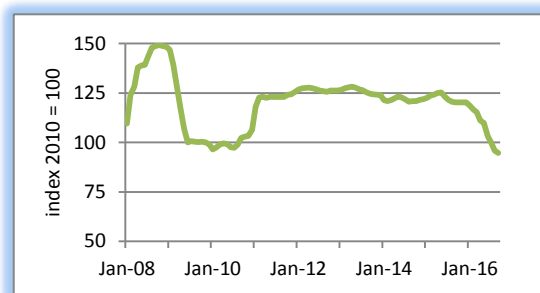


Source: Central Statistics Office (Various Years)

3.1.2 Fertiliser – usage and price 2016

Pasture and forage costs typically comprise about 20 percent of total production costs on dairy farms. Fertiliser purchases comprise about half of the pasture and forage cost element, with contractor costs accounting for most of the remainder. Figure 5 charts the Irish monthly index of farm level fertiliser prices from 2007 through to 2016.

Figure 5: Monthly Price Index of Fertiliser in Ireland for 2008 to 2016

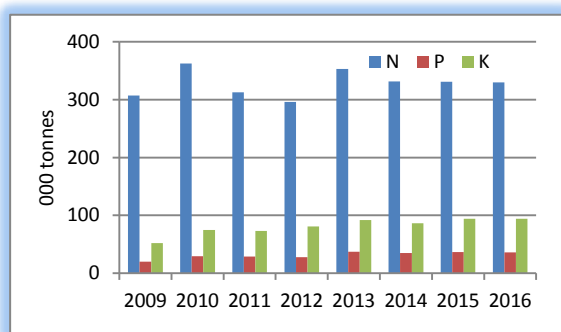


Source: Central Statistics Office (Various Years)

There was a significant decline in fertiliser prices in 2016. This reflected the decline in production costs internationally associated with lower energy prices. Gas is by far the largest cost component of nitrogen based fertilisers. Irish fertiliser prices for 2016 as a whole were about 14 percent lower than in 2015.

In 2016 for the third year in succession, nitrogen fertiliser sales nationally were relatively static. This is notable given that the total cattle population, and in particular the dairy cow population has been on the increase in the last three years. DAFM sales figures for 2016 indicate an across the board 1 percent reduction in nitrogen (N), phosphorus (P) and potassium (K) sales in 2016 relative to the 2015 level. These fertiliser sales data are reported in Figure 6.

Figure 6: Irish Fertiliser Sales by Compounders 2009 to 2016



Source: DAFM (various years)

Overall, taking account of the marginal change in the level of fertiliser sales and the significant decline in price, fertiliser expenditure per litre on the average dairy farms in 2016 is estimated to have fallen by 19 percent compared with the 2015 level. On a per hectare basis the reduction is estimated to have been 14 percent. Given that milk production has increased nationally again in 2016, this suggests that overall fertiliser expenditure per litre of milk produced has declined.

3.1.3 Contractor Costs usage and price 2016

Contractor costs comprise the remaining 50 percent of the pasture and forage cost element. While no official figures are available, it is assumed that there has been no change in contractor charges in 2016.

3.1.4 Pasture and Forage – usage and price 2016

With fertiliser expenditure estimated to have declined in 2016 relative to 2015 and expenditure on contracting estimated to be unchanged, pasture and forage expenditure is estimated to have fallen on a per hectare basis in 2016. This implies that expenditure on pasture and forage has fallen further still on a per litre basis on farms where milk production has increased. On a typical farm, where

milk production has increased by 5 percent in 2016, the decrease in expenditure on pasture and forage is estimated to be 11 percent on a per litre basis and 7 percent on a per hectare basis.

3.1.5 Energy and Fuel – usage and price 2016

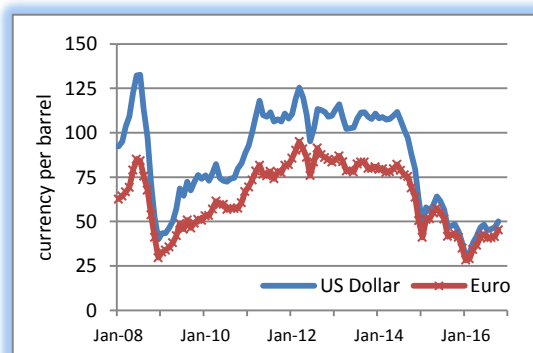
Energy and fuel are less important inputs than feed and fertiliser, comprising less than 10 percent of total costs on dairy farms. Electricity typically comprises about 30 percent of the total expenditure on energy and fuel on dairy farms, with motor fuel accounting for the remaining 70 percent.

Crude Oil and Motor Fuel Prices: Oil supplies have been stockpiling in 2016 with production generally running ahead of consumption. OPEC has attempted to rein in its production in recent months and this has led to a modest price increase in the final months of the year but generally remain below the US \$50 pb mark. Following their collapse in 2015 Brent crude oil prices remained depressed in 2016, reaching a price of just US \$30 per barrel (pb) in January 2016, the lowest prices since 2004. Prices rose gradually in 2016 as the year progressed toward the US \$50 mark.

Crude oil prices are presented in Figure 7. The average annual price for 2016 will be about US \$43 pb, which represents a reduction of 17 percent on the average oil price in 2015 (US \$52 pb).

The uncertainty about future growth prospects in Europe created by the Brexit decision, led to a slippage in the value of the euro against the US\$, but for the year as a whole there was little change in the value of the euro against the US\$.

Figure 7: Monthly Average Brent Crude oil prices in Euro and US dollar from 2008 to 2016



Source: St Louis Fed.

On an annual average basis, the euro was worth US \$1.11 in 2016, almost unchanged on its average

level for 2015. Hence, the estimated average crude oil price for 2016 was over €39 pb, a decrease in euro terms of about 17 percent on the 2015 value of €47 pb. Overall, fuel costs in Ireland experienced a significant decrease in 2016, with fuel prices approximately 12 percent lower in 2016 relative to the 2015 level.

Electricity Prices: Electricity costs change infrequently in Ireland due to price regulation. Prices have decreased in 2016 reflecting lower international energy prices. On an annual average basis, electricity prices in 2016 are estimated to have been 4 percent lower than in 2015.

Fuel and Electricity Volumes: Demand by farmers for fuel and electricity tends to be relatively inelastic with respect to price. It is difficult to determine to what extent increased milk production has had an impact on energy and fuel requirements.

Given that milk production is estimated to have increased nationally by 5 percent, this suggests that energy and fuel expenditure per litre of milk produced has declined even further on farms where milk production has increased. For the average dairy farm, the overall expenditure on both electricity and fuel is estimated to have decreased by 14 percent on a per litre basis and by 8 percent on a per hectare basis in 2016.

3.1.6 Other Direct and Fixed Costs—usage and price 2016

It is estimated that there was a 1 percent increase in agricultural wages in Ireland in 2016. Again, it is assumed that the quantity of hired labour used on farms is likely to have changed little year on year. Additional hours may have been required on farms that have expanded milk production.

As was the case in 2015, there was strong inflation in other input cost items in 2016 of about 4 percent. It is assumed that usage of these input items will be unchanged and, as a result, the increase in prices is reflected in a corresponding increase in expenditure on these items.

The assessment of fixed costs in the Teagasc National Farm Survey is quite complex and definitive information on how fixed costs have changed in 2016 will not be available until the National Farm Survey results for 2016 become available. At the overall farm level, it is estimated that fixed costs on dairy farms have not changed in

2016. However, due to the fall in milk price in 2016, the share of fixed cost allocated to the dairy enterprise on dairy farms is estimated to have declined by close to 1 cent per litre.

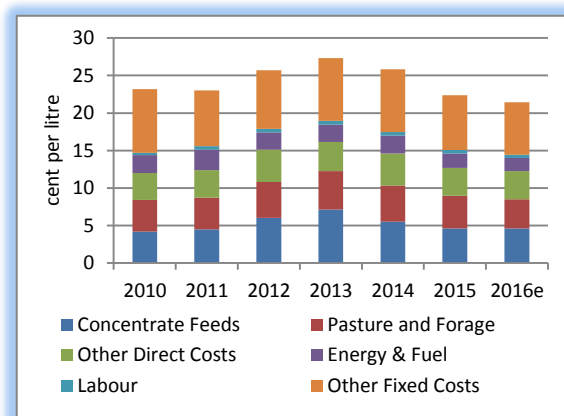
3.1.7 Estimate of Total Input expenditure for 2016

Many dairy farms in Ireland have continued to expand milk production in 2016. The possibility to produce more milk has allowed dairy farmers to exploit productivity improvements and spread fixed costs across a larger output volume. This will have an impact on the cost of production on both a per litre and per hectare basis. Increasingly, the assessment of costs on a per hectare basis will become the most relevant measure, but costs are also assessed here on a per litre basis, since it provides a useful comparator with previous years.

A comprehensive assessment of the impact of increased milk production on production costs is not possible given the heterogeneity of farms and their differing expansion strategies. Here it is assumed that the average farm has expanded its milk production by 5 percent in 2016.

Figure 8 charts the average total cost of production and its subcomponents for selected years from 2010 to 2015 and the associated estimates for 2016.

Figure 8: Total Costs of Milk Production in Ireland for selected years and estimate for 2016



Source: Teagasc National Farm Survey Data and Authors' estimate

Note: e = estimate

It is estimated that the total cost of production for in Ireland in 2016 was 20.9 cent per litre compared to an average of 22.4 cent per litre in 2015. This is equivalent to a 7 percent decrease in costs in 2016

relative to 2015 on a per litre basis. This cost reduction is mostly driven by a combination of lower input prices and partly due to efficiencies associated with increased milk production per farm.

3.2 Review of Dairy Market in 2016

The sharp decrease in dairy commodity and milk prices in 2015, continued through the early months of 2016. In spite of the steep fall in prices that had taken place by the end of 2015, the growth in global milk production took some time to slow down.

New Zealand (NZ) milk production has grown by 40 percent over the last seven years. NZ was the first major exporter to slow its milk production growth during the recent price collapse. Monthly NZ milk production has been falling since August 2015. NZ production in the 2015/16 year was down 1.6 percent (0.3 million tonnes) and production to date in the current 2016/17 season has been stable. The absence of support payments is likely to be the key reason why NZ milk producers responded more quickly to falling profitability.

EU milk production has grown by 10 percent over the last seven years, reflecting the gradual relaxation of the milk quota system and its eventual elimination. Production in the 2015/16 production season increased by 4.2 percent and a calendar year basis production in 2015 was up by 3.2 percent. EU milk production growth has finally slowed down in 2016, but early year production was well ahead of 2015 due to absence of supplerlevy concerns. In the second half of 2016, production growth has slowed further and was running a little over 2 percent ahead of the 2015 level at the end of August 2016. For 2016 as a whole EU milk production is likely to be up by about 1 percent on the 2015 level.

The overall EU production story masks quite a degree of variability at the MS level. In the Netherlands and Ireland in particular production has continued to grow strongly, up by 10.6 percent and 7.6 percent respectively in January to August 2016 on the same period in 2015. Production growth in the Netherlands continues to be spurred by concerns relating to an imminent cap on production to address phosphate levels. In Ireland production growth is at least partly being driven by the large increase in dairy cow numbers, in spite of the low milk price level. Germany, Poland and the Czech Republic have also exhibited large absolute increases in milk production in 2016. The most significant fall in milk production at the member

state level has been in the UK, where production in the period January to August 2016 was down over 0.3 million tonnes on the same period in the previous year. Total EU milk production in 2016 is likely to be up by 1 percent.

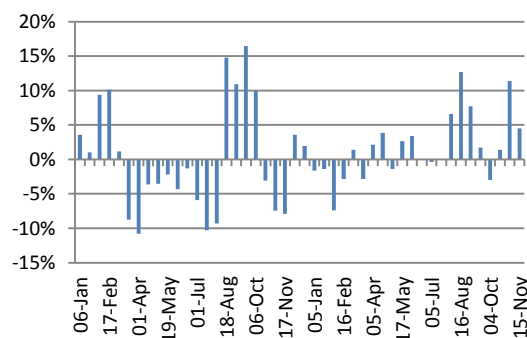
Milk production growth in the US has been more robust. US production in 2015 was up 1.3 percent (USDA 2015), reflecting an increase in both cow numbers and milk yields. Production in 2016 has continued to run ahead of the 2015 level, up by 1.6 percent in the period January to August 2016, relative to the same period in 2015. For 2016 as a whole USDA estimates that US milk production will be up 2 percent on the 2015 level.

In 2015 global milk production grew by 2 percent, but lower milk prices have affected production growth for 2016 (IDF, 2016). Global milk production may increase to 830 million tonnes (mt) in 2016, compared with 818 mt in 2015. This annual rate of increase of 1.5 percent is below the trend of the last fifteen years, which was 2.3 percent per annum.

On the demand side the Russian market remained closed to EU exports. Milk powder demand from China in 2016 increased modestly, but remained well below the level of earlier years. For the period January to September 2016 Chinese imports of SMP were 8 percent below the same period in 2015. By contrast, Chinese imports of WMP increased by 20 percent in January to September 2016 relative to the same period in 2015.

Figure 9 shows price movements in the influential New Zealand Global Dairy Trade (GDT) Auction Index. Following the generally negative auction results in 2015, prices movements were minimal in the first half of 2016.

Figure 9: GDT Auction Index Price movements in 2015 and 2016

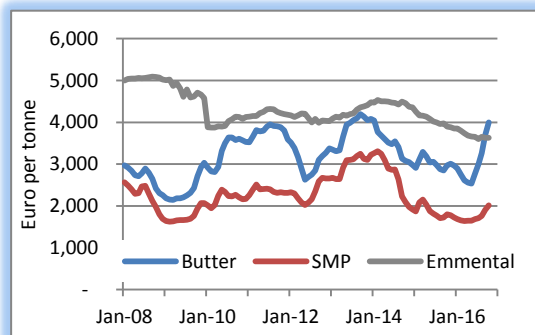


Source: GDT Auction

The first signs of a recovery were in April, but it was only at the end of July that prices in the index really developed upward momentum. The GDT results in October and November 2016 have been strongly positive.

European wholesale dairy product prices are shown in Figure 10. The weak market situation is evident in the low level of prices through much of 2016. The weakness of SMP prices is particularly noticeable, with prices at similar levels to 2009, through much of the year, although a recovery is now underway. The sudden and extremely sharp rise in butter prices in recent months is also evident.

Figure 10: European Dairy Product Prices 2008-16



Source: USDA 2016

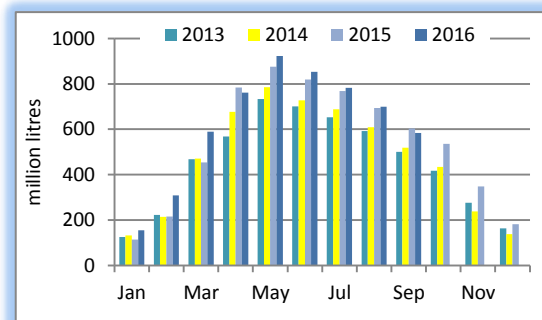
3.3 Estimated Output Values 2016

In 2015 milk quota elimination gave rise to a 13 percent increase in milk production in Ireland. In spite of the lower prices recorded in 2016, the dairy cow herd continued to grow strongly. The need to generate cash in the presence of low milk prices also motivated continued growth in milk production.

Figure 11 shows monthly Irish milk deliveries in 2016. In the first half of 2016 production showed a further sharp increase relative to the same period in 2015, but this was partly a function of the constrained milk production in the early part of 2015, as producers sought to limit their milk quota super levy liability.

As 2016 progressed milk production growth in Ireland has slowed and for the year as a whole is likely to be about 5 percent up on the 2015 level. Irish dairy cow numbers, as recorded in June 2016 increased to 1.397 million, compared with 1.295 million in 2015, an increase of 7.8 percent (CSO 2016). This means that the increase in Irish dairy cow numbers since 2010 is almost 31 percent.

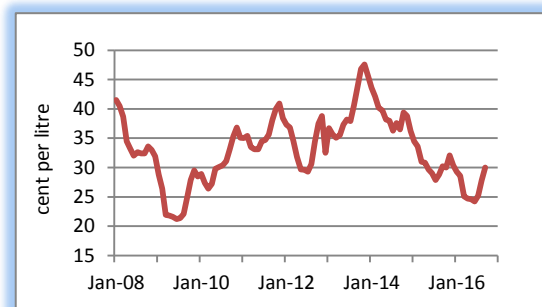
Figure 11: Monthly Irish Milk Deliveries in 2013 to 2016



Source: CSO, DAFM

Figure 12 presents monthly Irish milk prices recorded by the CSO from January 2008 through to September of 2016. In Ireland the 2016 manufacturing milk price is estimated to have decreased by about 11 percent relative to the 2015 level on an actual constituents basis.

Figure 12: Irish Farm Gate Milk Prices Actual fat (vat incl.) 2008 – Sept 2016



Source: CSO.

Note: Actual fat (VAT inclusive)

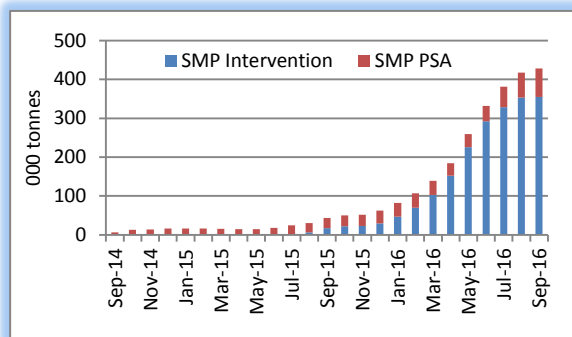
The annual average national milk price (CSO definition) is estimated to be close to 27 cent per litre (vat inclusive) in 2016 on an actual fat and protein basis (estimated to be 4.10 percent fat and 3.45 percent protein).

The depressed state of the dairy market in the EU led to a considerable build-up of both public and private SMP stocks. EU intervention stock and stock in Private Storage Aid (PSA) are shown in Figure 13. By September 2016 combined EU intervention and PSA SMP stocks stood at almost 430,000 tonnes or about 4 million tonnes in milk equivalent terms.

In recognition of the evident market imbalance, a voluntary milk supply management scheme has been introduced in the EU. The scheme has an overall EU budget of €150 million, with payments

valued at approximately €138 per tonne, representing a total of 1.1 million tonnes of milk.

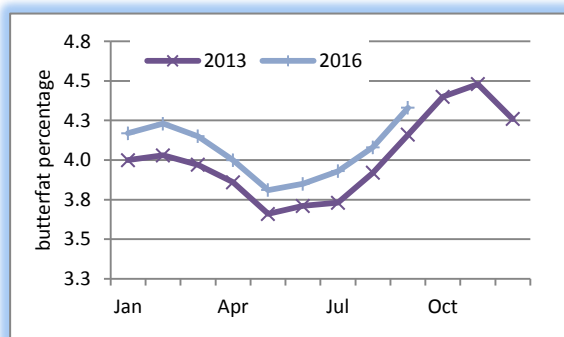
Figure 13: EU SMP Intervention and Private Storage Aid (PSA) Stocks



Source: Milk Market Observatory

Applications from farmers in Ireland, have totalled 0.074 million tonnes. This is equivalent to 1.2 percent of Irish milk production in 2015 and represents about 7 percent of the total reduction in the EU. This reduction equates to a payment of a little over €10 million. The initial reduction period runs from October to December 2016.

Figure 14: Butterfat in Irish Milk Deliveries 2013 and 2016



Source: CSO

In addition to the growth in milk production volumes, there has been an impressive increase in both fat and protein levels in Irish milk deliveries in the last three years as illustrated in Figure 14. The average fat content of Irish milk deliveries in 2016 is likely to reach about 4.1 percent. However, it appears that protein levels for 2016, at 3.46 percent, have dropped slightly relative to 2015.

3.4 Review of Dairy Enterprise Net Margins in 2016

The review of milk prices showed that the average milk price for 2016 was down 10 percent on the 2015 level. The review of input costs concluded that for the average farm, having expanded its milk

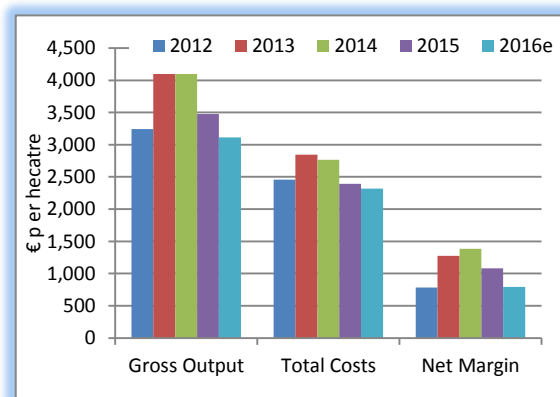
production by 5 percent, total production costs on a per litre basis are estimated to have decreased by 7 percent in 2016 relative to 2015.

It is not possible to provide a farm specific indication of the change in margin per litre (or per hectare) in 2016, given that individual farms will have expanded production to differing extents and will have faced differing marginal costs for the additional milk produced. These uncertainties feed into the calculation of the average margin per litre (hectare) that was achieved in 2016.

Margin per hectare is described before examining the margin on a per litre basis. Figure 15 presents the estimated average gross output, production costs and net margin per hectare for 2016 in comparison to recent years on the basis of a 5 percent increase in milk production.

In estimating the margin per hectare, changes in the price of milk and in the price of input items tells only part of the story. The increase in milk production continues to have an impact on the output, costs and margin per hectare that was achieved. Here we assume that the increase in production has taken place alongside a 2 percent increase in the land base of the average farm's dairy enterprise.

Figure 15: Average Gross Output, Costs & Margins per hectare for Irish Milk Production in 2012-2015 & estimate for 2016



Source: Teagasc National Farm Survey Data and Author estimates

Note: e = estimate

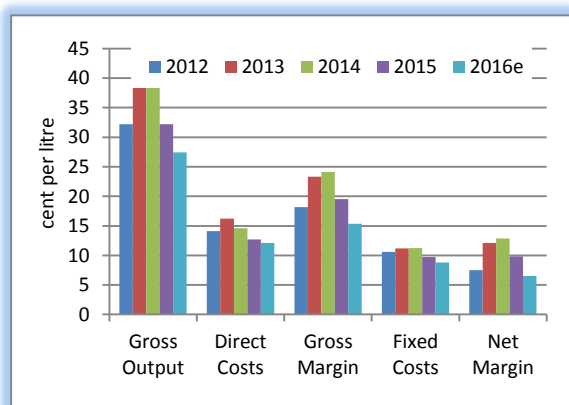
For 2016 the net margin for milk production averaged €795 per hectare. This makes 2016 the lowest margin year since 2012, in spite of the increase in milk production per farm in the intervening years. Importantly, margins are estimated to be far higher than in the previous crisis

period in 2009. The decline in margin per hectare in 2016 is estimated to have been 27 percent. A sharper decline in margin per hectare will have been recorded on farms with a more modest increase in milk deliveries.

Estimated average net margin per litre is shown in Figure 16 on the basis of a 5 percent increase in milk production. Gross output per litre is estimated to have decreased in 2016 to 28.1 cent per litre. Input costs also decreased due, in the main, due to lower, fertiliser and fuel expenditure and productivity gains. Even though milk production increased in volume terms, the fixed cost allocation to the dairy farm's dairy enterprise decreased due to the low milk price.

Overall, the estimated fall in total costs of over 1 cent per litre in 2016, partially alleviated the 3 cent fall in milk prices. The estimated net margin in 2016, of 7.1 cent per litre, represents a 27 percent reduction on that recorded in 2015. See Table A5 and Table A6 for estimates of output, costs and margins on a per litre and a per hectare basis for a farm that has achieved a 5 percent expansion in milk production in 2016.

Figure 16: Average Gross Output, Costs & Margins per litre for Irish milk production in 2012-2015 and estimates for 2016



Source: Teagasc National Farm Survey Data and Author estimates

Note: e = estimate

It should be noted that the net margin calculation presented here does not reflect outstanding superlevy fines or the recently agreed compensation package that will be availed of by some producers.

4. Outlook for 2017

The discussion of production costs in 2017 is complicated by the fact that milk production is

likely to increase further on many farms. For the purposes of this analysis a 6 percent increase in total Irish milk production in 2017 is forecast, with a slight increase of 3 percent in the dairy enterprise's land base.

A further increase in production in 2017 can be expected to lead to increased input usage on farms where expansion takes place. The extent of this increase will be highly farm specific.

4.1 Outlook for Input Expenditure 2017

In this analysis of likely changes in production costs in 2017, for simplicity it is assumed that the average farm increases its milk production by 6 percent in 2017, equivalent to the percentage increase in national production forecast in this paper.

4.1.1 Feed usage and price 2017

Animal feed prices are driven by a combination of Irish cereal harvest prices (for the previous year and current year) and the prices of imported feed. Cereal prices at harvest 2016 were down a little on the 2015 level. This reflected yet another bumper international harvest across much of the main production regions of the world, for the fourth year in succession.

The volume of dairy feed used per head appears to have decreased slightly in Ireland in 2016 by about 4 percent, which has been partially reflected by estimated slight drop in milk yields. With the assumption of normal weather in Ireland in 2017, and with a recovery in milk prices, feed volume requirements per head for grassland enterprises are expected to increase on farms continuing to increase milk production.

Farmers should not see much variation in feed prices at least until harvest 2017 approaches, with international weather conditions likely to determine exactly how grain and feed prices move at that point.

It is reasonable to suggest that upside feed price pressure is more limited given the recovery in cereal stock levels over the last three years. A slight increase in cereal prices is forecast in 2017. Taking account of the fall in cereal prices in 2016, this will mean that feed prices in 2017 should be on a par with the 2016 level.

An increase in feed volume of 3 percent per head is factored in for 2017. Allowing for a slight increase in dairy hectareage, which would give rise to a 3

percent increase in feed expenditure on a per hectare basis. Given the assumed 6 percent increase in milk output, this would mean that expenditure on feed would actually be unchanged on a per litre basis in 2017.

4.1.2 Fertiliser & Contracting Costs—usage and price 2017

Although monthly fertiliser prices are forecast to move upwards through 2017, the fall in fertiliser prices in the second half of 2016, means that fertiliser prices in early 2017 will be considerably below the price that prevailed in early 2016. Farmers will therefore benefit from lower fertiliser prices in the main purchasing months in 2017. Overall, the annual average fertiliser price in 2017 is forecast to be 5 percent lower in 2017 compared with the 2016 level.

A further weakening of the euro against the US \$ in 2017 is not assumed, but cannot be ruled out. If the euro did weaken, this would then put some upward pressure on fertiliser prices, given that much of the fertiliser trade is US \$ based.

It is forecast that fertiliser use in 2017 will be 5 percent higher than in 2016. To date dairy expansion has not led to increased fertiliser sales, but as production increases further in 2017, additional fertiliser is likely to be required. With fertiliser prices falling and usage levels rising, this would mean that the total expenditure on fertiliser in 2017 would be unchanged on a per hectare basis.

No change in agricultural contracting charges is forecast, with the volume of contracting undertaken and the associated expenditure assumed to remain unchanged in 2017. This would leave total pasture and forage costs per hectare unchanged in 2017 relative to 2016. However, with a forecast increase in milk production of 6 percent, fertiliser and contracting charges would decrease by 3 percent on a per litre basis in 2017.

4.1.3 Energy and Fuel – usage and price 2017

An analysis of futures prices indicates that the balance of market opinion sees Brent crude oil prices remaining close to \$52 over the course of 2017. This equates to close to €48 pb at a euro exchange rate of \$1.09, which would represent an increase of 22 percent in oil prices in euro terms in 2017 relative to the average 2016 level. This suggests that there would be a 10 percent increase

in fuel prices in 2017. Electricity prices are not assumed to change in 2017, as the wider range of energy prices associated with electricity production are not anticipated to increase. Factoring in a slight increase in usage volume associated with increased milk production, this would leave expenditure per hectare on energy and fuel up about 8 percent in 2017 relative to the 2016 level. On a typical farm, expanding its milk production by 6 percent in 2017, this would equate to a smaller increase of about 5 percent on a per litre basis.

4.1.4 Other Direct and Fixed Costs – usage and price 2017

While the UK's Brexit decision creates uncertainty, macroeconomic indicators for Ireland remain reasonably positive. Real GDP growth in 2017 is forecast to be 3.8 percent, which is lower than in 2016 (ESRI, 2016). Irish unemployment is now at its lowest level since 2008. It can be expected that wage inflation will pick up slightly in 2017. Therefore an increase in labour costs in 2017 of 2 percent is forecast. The increase in the general inflation affecting other farm costs in 2016 is forecast to be slightly stronger at 3 percent on a per hectare basis. Allowing for an increase in milk production of 6 percent this would correspond with a 3 percent increase relative to 2016 on a per hectare basis. However, on a per litre basis, these costs would remain unchanged.

With the dairy enterprise in expansionary mode on most Irish dairy farms, other things being equal the share of fixed cost allocated to the dairy enterprise would increase. This was not the experience in 2016 as low milk prices, meant that an increased share of the farm's overhead costs were allocated to the non-dairy enterprises on the farm. However, with a recovery in milk prices in 2017, the dairy enterprise fixed cost allocation should increase in 2017.

4.1.5 Estimate of Total Input expenditure for 2017

Overall, production costs per hectare are forecast to increase by about 5 percent in 2017, mainly due to higher feed and fuel expenditure and a higher fixed cost allocation for the dairy enterprise. However, increased milk production should leave production costs up just 2 percent on a per litre basis.

4.2 The Outlook for Dairy Markets in 2017

Market prospects for 2017 look positive at the global level, the protracted trough in international dairy product prices seems to be coming to an end and an improvement in farm level milk prices is emerging with the usual lag. However, one area of concern, particularly in the EU, is the large SMP public and private stock level that has developed over the last 12 months. How quickly these stocks can be disposed of remains an area of uncertainty. As long as these stocks are withheld from the market they will limit the growth in commodity prices and farm milk prices. Equally, market demand will need to be sufficiently robust to allow stocks to be released without having an adverse impact on commodity prices.

The improvement in milk prices is likely to coincide with the 2017 Irish milk production season, which should allow dairy farmers derive a significant benefit from the strengthening milk prices.

EU milk production is likely to continue to increase in 2017, but the growth in production is likely to be the lowest seen since milk quotas were removed, perhaps as little as 0.5 percent. In 2017 EU dairy cow numbers are likely to see their largest annual reduction since 2010. However, the contraction in cow numbers should be offset by stronger growth in milk yields given the improved milk prices and low feed costs that should prevail.

For 2017 latest forecasts suggest a 2 percent increase in US milk production. This increase reflects a combination of increased milk yields and a growth in cow numbers (USDA, 2016).

Production in NZ is likely to resume growth at some point in 2017. Monthly production to date in the 2016/17 season has generally been on a par with the 2015/16 season. It may take until the 2017/18 production season before NZ production growth resumes.

On the demand side internal EU consumption should continue to increase, with stronger consumption growth for cheese and SMP than in the case of butter, where recent high prices are likely to constrain demand. The continuation of low crude oil prices may dampen dairy product import demand in countries where oil revenues represent a major share of GDP. Chinese dairy import demand may pick up further.

Taking these factors into consideration, it is likely that an improving dairy market situation will develop into the first half of 2017. Given the seasonal milk production profile in Ireland, a continuing improvement in dairy product prices over the next six months would benefit overall average farm milk prices for 2017.

Current (November 2016) Irish farm milk prices are already in recovery, but it is difficult to gauge the pace that this recovery will take. The annual average Irish milk price in 2017 is likely to be significantly higher than the 2016 level. A further improvement in milk fat and protein content may also help to lift milk prices on actual constituents basis. Overall, it is estimated that the annual average farm milk price in 2017 will be 15 to 20 percent higher than that of 2016, giving an annual average milk price (CSO definition) of between 31 to 32.5 cent per litre, on an actual fat, vat inclusive, basis.

4.3 The Outlook for Milk Production in 2017

In spite of the continuing fall in milk prices in 2016, the removal of milk quotas saw Irish milk production increase by an estimated 5 percent. This was achieved entirely through an increase in cow numbers of over 7 percent. On average milk yields appear to have declined slightly in 2016. It is reasonable to expect that, given a recovery in net margin in milk production, further expansion in milk production will occur in 2017. This expansion will be based on increased cow numbers and yield improvement, with a national average increase of 6 percent forecast relative to the 2016 level.

4.4 The Outlook for Dairy Enterprise Net Margins in 2017

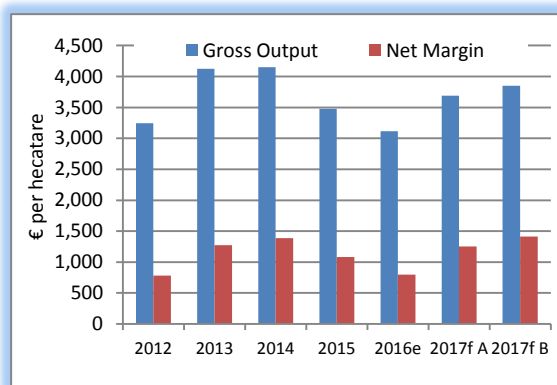
This section considers the impact of changes in milk prices and production costs on gross and net margins on dairy farms in 2017. With the exception of fuel, the main subcomponents within the dairy production cost basket are forecast to exhibit little change in price in 2017 relative to 2016. It is assumed that the further milk expansion in 2017 takes place on a 3 per cent larger land area than in 2016, i.e. it is assumed that milk production per hectare will increase by 3 percent in 2017 relative to 2016.

In 2017, profitability per hectare, as measured by the net margin on the average dairy farm, producing 6 percent more milk, is forecast to

increase. Average net margin per hectare is estimated to be €795 for 2016, but is forecast to increase to a range of €1,250 –€1400 or 58 to 78 percent in 2017, as illustrated in Figure 17.

The additional milk production is assumed to be produced at a low marginal cost, which contributes to the margin achieved per hectare. Production costs for the marginal litres are lower since some cost items do not increase in a linear fashion when production increases, eg fertiliser expenditure, other direct costs, energy and hired labour.

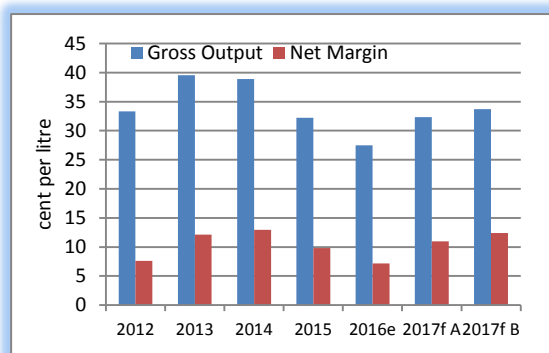
Figure 17: Average Gross Output and Net Margin per hectare for 2012 to 2016 with Forecast for 2017



Source: Teagasc National Farm Survey Data and Author estimates. Note: e = estimate f = forecast

Figure 18 presents a margin forecast on a per litre basis for the average dairy farm where production increases by 6 percent in 2017 relative to the 2016 level.

Figure 18: Average Gross Output and Net Margin per litre in Ireland 2012 to 2016, with Forecast for 2017



Source: National Farm Survey Data (Various Years) and Author estimates
Note: e = estimate f = forecast

Given the forecast 15 to 20 percent increase in the annual average milk price in 2017, gross and net

margins are forecast to improve in 2017. Net margin per litre is forecast to increase by 53 to 73 percent in 2017, to an average of 11 to 12.4 cent per litre.

Overall dairy enterprise margins at the farm scale will be influenced not just by changes in margin per hectare, but also by the numbers of hectares farmed by the dairy enterprise. This has been increasing in recent years and is anticipated to increase further.

5. Concluding Comments

Dairy incomes reached record levels in 2014, with marginally lower milk prices more than offset by lower costs of production. This was followed by 18 months of negative price developments on international dairy markets, which only began to reverse in the middle of 2016. Low milk prices in 2016 wiped out any income benefit of increased milk production. However, Irish farm milk prices will recover gradually in 2017. Overall, a minor increase in milk production costs per litre in 2017 relative to 2016 can be expected.

Based on these forecast production levels, output price and input cost movements, dairy margins per litre and per hectare are likely to improve in 2017 compared with 2016. Average net margins are forecast to be about 10.5 cent per litre or €1,198 per hectare in 2017.

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Table A1: Average Gross and Net Margin of Milk Produced

	2014	2015	% Change
	cent/litre		
Total Gross Output	38.72	32.21	-17
Concentrate Costs	5.49	4.60	-16
Pasture and Forage Costs	4.84	4.35	-10
Other Direct Costs	4.28	3.73	-13
Total Direct Costs	14.60	12.68	-13
Gross Margin	24.11	19.53	-19
Energy and Fuel	2.40	1.94	-19
Labour	0.46	0.44	-4
Other Fixed Costs	8.38	7.33	-13
Total Fixed Costs	11.23	9.71	-13
Net Margin	12.88	9.82	-24

Source: Teagasc National Farm Survey Data

Table A2: Average Net Margin per hectare*

		2014	2015	% Change
Milk Produced	litres/ha	10,438	10,755	+3
Total Gross Output	€/ha	3,984	3,475	-13
Total Costs	€/ha	2,640	2,392	-9
Net Margin	€/ha	1,344	1,083	-19

* - Hectare of forage area allocated to the dairy enterprise

Source: Teagasc National Farm Survey Data

Table A3: Costs and profit (cent per litre) for Top, Middle and Bottom one-third of farms in 2015

	Top	Middle	Bottom
	cent/litre		
Concentrate Feeds	3.90	4.34	5.51
Pasture & Forage	4.01	4.20	4.80
Other Direct Costs	3.61	3.85	3.73
Energy & Fuel	1.69	1.93	2.17
Labour	0.68	0.35	0.29
Other Fixed Costs	6.87	7.43	7.68
Total Costs	20.77	22.10	24.18
Net Margin	12.52	10.22	6.89

Source: Teagasc National Farm Survey Data

Table A4: Output and profit per hectare for Top, Middle and Bottom one third of farms in 2015

		Top	Middle	Bottom
Stocking rate	cows/ha	2.45	2.03	1.52
Milk sold	litres per ha	14,368	10,574	7,503
Concentrates fed per cow	kg	871	861	978
Concentrates fed per litre of milk produced	kg	0.15	0.16	0.20
Gross output	€ per ha	4,764	3,408	2,315
Direct Costs	€ per ha	1,693	1,344	1,062
Gross Margin	€ per ha	3,071	2,064	1,253

Source: Teagasc National Farm Survey Data

Table A5: Average Gross and Net Margin per litre of Milk Produced 2014-2016

	2014	2015	2016e
	cent/litre		
Total Gross Output	38.72	32.21	28.11
Concentrate Costs	5.49	4.60	4.51
Pasture and Forage Costs	4.84	4.35	3.86
Other Direct Costs	4.28	3.73	3.74
Total Direct Costs	14.60	12.68	12.11
Gross Margin	24.11	19.53	15.99
Energy and Fuel	2.40	1.94	1.67
Labour	0.46	0.44	0.50
Other Fixed Costs	8.38	7.33	6.65
Total Fixed Costs	11.23	9.71	8.82
Net Margin	12.88	9.82	7.18

Source: Teagasc National Farm Survey Data. Figures for 2016 are estimates

Table A6: Average Gross and Net Margin per hectare 2014 -2016

	2014	2015	2016e
	€ per hectare		
Total Gross Output	3,984	3,475	3,114
Concentrate Costs	561	494	499
Pasture and Forage Costs	488	460	428
Other Direct Costs	448	406	415
Total Direct Costs	1,498	1,361	1,342
Gross Margin	2,486	2,114	1,772
Energy and Fuel	237	202	185
Labour	53	54	55
Other Fixed Costs	852	775	736
Total Fixed Costs	1,142	1,031	977
Net Margin	1,344	1,083	795

Source: Teagasc National Farm Survey Data. Figures for 2016 are estimates

Irish Cattle Farming in 2015



Irish Cattle Slaughter

1.658 million head (down 4.7%)



Stocking Rate (Calf to Weanling)

average of 1.18 lu/ha (up 1.7%)



Live Exports

0.356 million head (down 25%)



Stocking Rate (Calf to Store)

average of 1.37 LU/ha (down 2.8%)



Irish Suckler Cow Numbers

1.053 million (up 1.1%)



Stocking Rate (Calf to Finishing)

average of 1.5 LU/ha (down 8%)



Weanling price

average €755/head (up 2%)



Stocking Rate (Cattle Finishing)

average of 1.48 LU/ha (down 3%)



Male Store price

average €980/head (up 6%)



Concentrate Fed/LU (Cattle Finishers)

average 763 kg (up 11%)



Female Store sale price

average €913/head (up 2%)



Slaughter Weight/Head

average 340 kg (up 1.8%)



Male Finished Animals Price

average €1,554/head (up 16%)



Total Production Costs (Single Suckling)

average €908 per hectare (down 1%)



Female Finished Animals Price

average €1,365 head (up 11%)



Total Production Costs (Cattle Finishing)

average €1,105 per hectare (down 1%)



Gross Margin

(Single Suckling)

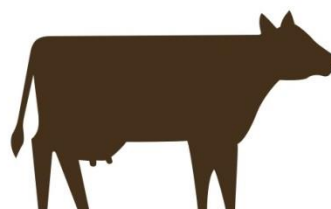
average €464 per hectare (up 37%)



Gross Margin

(Cattle Finishing)

average €461 per hectare (up 47%)



Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cattle Farming in 2016



Lower output prices
for calves and adult animals



R3 Steer price
down 5% on the 2015 level



Weanling and Store prices
down 8% on the 2015 level



Weather Conditions
Average, not as favourable
as 2015



Grass Availability
Not as good as 2015



Fertiliser Prices
down 15% on 2015 level
Fertiliser Use
little changed on 2015 level



Feed Prices unchanged
Feed use down slightly



Other Direct Costs
up 4% on the 2015 level



Fuel prices
down 12% on the 2015 level



Total Input Costs
Overall, input costs 5% lower
than in 2015



Gross Margin (Suckler)
unchanged on the 2015 level
Gross Margin (Finisher)
down 3% on the 2015 level



Irish Cattle Farming in 2017



Sizeable drop in output prices
for calves and adult animals



R3 Steer prices
down 12% on the 2016 level



Weanling and Store prices
down 10% on the 2016 level



Weather Conditions
Normal weather assumed



Grass Availability
Similar to 2016



Fertiliser Prices
down 5% on 2016 level
Fertiliser Use
little changed on 2016 level



Feed Prices unchanged
Feed use unchanged



Other Direct Costs
up 3% on the 2016 level



Fuel prices
up 10% on the 2016 level



Total Input Costs
Overall, input costs slightly
higher than in 2016



Gross Margin (Suckler)
down 14% on the 2016 level
Gross Margin (Finisher)
down 19% on the 2016 level



Source: Teagasc Estimates for 2016 and Forecasts for 2017

Review of Cattle Farming in 2016 and Outlook for 2017

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1. Introduction

This paper presents a review of the economic performance of Irish cattle production in 2015 based on data provided by the Teagasc National Farm Survey (Hennessy and Moran, 2016). Estimated returns from cattle production in 2016 and the forecast for 2017 are also presented.

In 2016 Irish cattle prices, across all age categories, have declined relative to 2015. The increase in finished cattle prices in 2015 has been largely reversed in 2016. Prices for younger cattle have also been lower than in 2015.

Lower cattle prices in 2016 have been caused by the weakening of sterling against the euro, increased supplies of both prime cattle for slaughter and younger animals for further feeding in Ireland, and an increase in beef supply on EU markets that arose as a result of the increase in EU cow slaughter.

Prices of finished cattle in 2016 have declined relative to the levels observed in 2015, with R3 steer prices, on average, 5 percent lower than in 2015 (young bull prices have declined by marginally more than steer prices down 6 percent). Calf prices have on average declined in 2016, with prices for beef calves declining by 5 percent compared with 2015 though dairy bull calf prices in 2016 recovered by almost 6 percent compared with 2015. Weanling and store cattle prices, in line with prime cattle prices, have also been weaker in 2016, with prices on average 7 percent lower than in 2015.

These negative price dynamics mean that the market value of farm output on Irish cattle farms has declined in 2016. The generally smaller decline in finished cattle prices is reflected in a smaller decline in the output value on Cattle Finishing enterprises as compared to Single Suckling enterprise. The average decline in weanling and beef calf prices has exceeded the reductions in finished cattle prices. On Single Suckling enterprises changes in calf, weanling, store and finished cattle prices all directly affect the value of output per hectare. On the Cattle Finishing

enterprise, lower prices paid for calves and weanlings purchased in increases the value of enterprise output, other things being equal.

The negative story for beef farmers of generally lower cattle prices in 2016 has been offset partially by mostly lower levels of expenditure on direct inputs, particularly on pasture and forage costs (largely based contracting costs and fertiliser expenditure). Lower overall input expenditure offsets partially the negative impact of lower output value on margins.

On average gross margins on Single Suckling farms are estimated to have not declined in 2016 with the lower output value that has arisen as a result of the reductions in Irish cattle prices in 2016 offset by lower expenditure on direct costs and receipt of payments under the Beef Data Genomics Programme (BDGP). On average Single Suckling farms are estimated to have earned marginally positive net margins in 2016.

On Cattle Finishing enterprises the decline in finished cattle prices in 2016 was also reflected in lower output value. The negative impact on output value of the lower finished cattle prices is partially offset by the lower prices that many of these farmers have paid for weanlings and store cattle in 2016. Overall however, cattle finishers are expected to see output value decline. Lower input expenditure will mean that gross margins per hectare while lower, do not decline in line with the decline in output value. On Cattle Finishing enterprises gross margins are estimated to decrease by 3 percent. Slightly reduced gross margins on cattle finishers are also reflected in lower net margins on these farms, with Cattle Finishers in 2016 estimated to have earned on average negative net margins of -€47

The outlook for Irish cattle markets in 2017 is negative but also very uncertain. Supply and use developments for beef in Ireland and across the EU during 2017 are likely to mean that cattle prices in Ireland will decline relative to the average levels received by Irish farmers in 2016. However, developments in currency exchange rates during

2017, arising from the British vote for Brexit, could magnify forecast price reductions but would also be reflected in some lower (imported) input costs.

On the assumption that the euro/pound sterling exchange rate stays at or close to the value currently observed, our forecast is that prices for cattle in 2017 will be lower than in 2016. Growth in demand for beef in the EU is forecast to be marginally positive due to continued weak economic growth in the Eurozone and forecast slowing economic growth in the UK (HM Treasury 2015). While lower grain and oilseed prices are expected to be reflected in lower poultry and pig meat prices in 2017. The low price of competing meats will continue to place competitive pressure on EU beef prices.

EU beef supplies in recent years have increased. The dynamics behind these increases have largely been due to developments in dairy markets. In 2016 low milk prices led to a large increase in the volume of cow slaughter in the EU, which boosted EU beef production. This increase in cow slaughter was reflected in the cessation of the post-quota expansion of the EU dairy cow herd. However the increases in cow inventories in recent years are now being reflected in higher numbers of other cattle on feed that will be available for slaughter during 2017. The positive impact of increased other cattle availability on beef production will be partially offset by lower levels of cow slaughter in 2017 as dairy markets recover. Overall, growth in aggregate EU production and supply of beef in the context of weaker world market prices (USDA, 2016) is expected to lead to further reductions in EU cattle prices.

Global production and exports of beef are both expected to increase in 2017 (USDA, 2016). The forecast increase in meat production is largely driven by developments in the US and Brazil, where the recent breeding herd rebuilding phase is now being reflected in increased meat production. On-going stock rebuilding in Australia, following the breaking of the recent drought, will reduce Australian beef production and exports and help limit the degree to which growing US and South American production depresses world beef prices. Nevertheless, with on-going slow economic growth globally, world beef prices are likely to fall in 2017 as compared to 2016.

On balance our forecast for 2017 is that Irish cattle prices will decrease significantly. Increases in the

volume of cattle available for slaughter in Ireland, lower EU cattle and beef prices and a weaker average euro pound sterling exchange rate in 2017 are forecast to result in Irish cattle prices that are 12 percent lower than observed in 2016.

As in previous years, developments in the euro/pound sterling exchange rate will affect Irish cattle prices given the continuing dependence of the Irish beef industry on the UK market. In 2016 the weakening of sterling undermined Irish cattle prices. In this outlook we have assumed no further depreciation of the pound relative to the euro from its current level (November 2016). This will mean, however, that on average over the course of 2017 we are assuming a further depreciation of sterling relative to the average level in 2016. The weakening of this critical exchange rate will have negative impacts on Irish cattle prices. Continued uncertainty over the evolution of the exchange rates constitutes a very major element of the uncertainty in these forecasts.

The BDGP will during 2016 and 2017 provide exchequer support to participating farmers to enable them to improve the genetic merit of their beef animals and thereby lower the greenhouse gas intensity of their beef production. The BDGP involves a payment of approximately €80 per cow for farmers participating. However, not all suckler cows will be farmed by participating farmers and the budget for the programme is limited to approximately €52 m per annum. This means that the average value of the BDGP per cow to suckler cow farmers will be lower than the headline rate. In our analysis we have assumed that the average suckler farmer will receive a payment of €44 per ha from the BDGP in 2016 and 2017.

Unless stated otherwise, all figures referred to in this paper are in nominal terms and all enterprise output and profit estimates exclude the value of decoupled income support payments.

2. Review of the Economic Performance of Beef Farms in 2015

The trends in average family farm income (FFI) for the two types of cattle farms identified in the Teagasc NFS over the period 2005 to 2015 are shown in Figure 1. Readers should note that the narrowing of the Teagasc NFS sampling frame in 2012 is likely to have affected the average level of FFI on Irish cattle farms measured by the Teagasc NFS. Some of the growth in FFI over the period since 2011 may be attributable to this sample

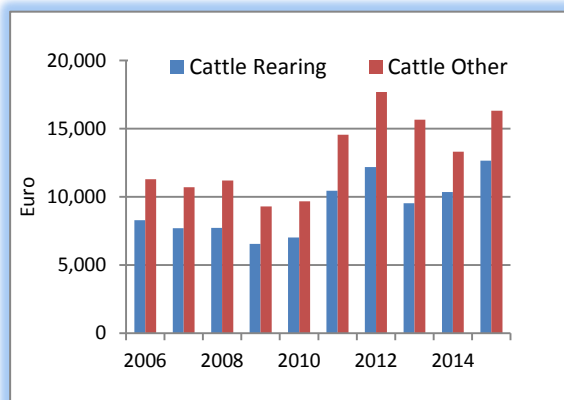
change rather than to fundamental changes in the profitability of Irish agriculture. A reweighted sample extending back over time is to be released in 2017.

In 2015 the average FFI on Teagasc NFS *Cattle Other* and *Cattle Rearing* farms increased substantially compared with 2014 levels. The 2015 FFI on *Cattle Rearing* and *Cattle Other* farms increased by 22 percent when compared with the 2014 level. The large percentage increase in 2015 arose as a result of the favourable output price developments in 2015 and the continuing low level of FFI on both cattle farm types. The relatively modest change in FFI in 2015 given the continuing low level of cattle farm income translates into large percentage increases. Figure 1 also illustrates that the gap in average FFI earned by farms in the cattle rearing system and cattle other system that narrowed considerably in 2014 grew again in 2015.

In this year's analysis we continue to present results based on the two way categorisation of Irish cattle enterprises: *Single Suckling* and *Cattle Finishing* enterprises first used in Breen and Hanrahan (2012) and the Teagasc NFS cattle enterprise fact sheets (Teagasc, 2016a and 2016b).

Single Suckling enterprises in the analysis that follows are enterprises with more than 10 cows, while the *Cattle Finishing* enterprises analysed were those with more than 10 livestock units and where more than 70 percent of the animals sold off of the farm were sold for slaughter. In total, these two enterprises were present on more than 40,000 farms nationally.

Figure 1: Family Farm Income on Cattle Rearing and Cattle Other Farm Systems: 2006 to 2015



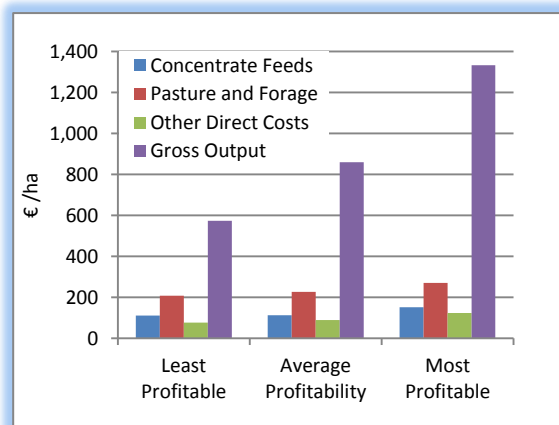
Source: 2015 Teagasc National Farm Survey (2016)

2.1 Irish Beef Enterprise Performance in 2015

This section discusses the cost structure of Single Suckling and Cattle Finishing enterprises in Ireland. Farms with these enterprises have been ranked on the basis of gross margin earned per hectare and each farm enterprise group has been broken into three equally sized sub-groups, which we have termed farms that are *least profitable*, those that have *average profitability* and those that are *most profitable*.

Single Suckling: In 2015 the average direct cost of production per hectare for Single Suckling enterprises ranged from €396 per hectare, on those farms with the lowest average gross margin, to €548 per hectare on the most profitable farms (see Figure 2). The cost of concentrate feed, along with the cost of pasture and winter forage typically accounts for approximately 80 percent of the direct costs of production on Single Suckling farms. The average expenditure on concentrate feed varied from €112 per hectare on the low profitability farms to €152 per hectare on the high profitability farms.

Figure 2: Variation in Total Production Costs and Gross Output on Single Suckling enterprises in 2015



Source: 2015 Teagasc National Farm Survey (2016)

There was considerably more variability in the average gross output per hectare between the least profitable and most profitable farms. The most profitable third of Single Suckling enterprises earned an average gross output of €1,332 per hectare, compared with an average gross output of €574 per hectare on the least profitable one third of Single Suckling enterprises. This variability in average gross output is largely due to higher average stocking on the more profitable farms. In

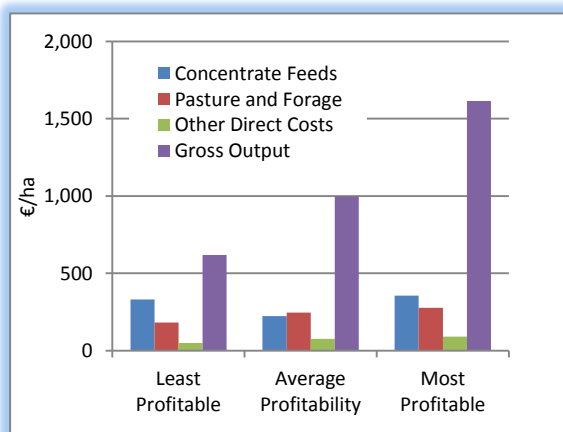
2015 the most profitable Single Suckling enterprises had an average stocking rate of 1.7 livestock units (LU) per hectare compared with 1.05 LU per hectare for those enterprises with the lowest levels of profitability. The capacity of farms to operate at high stocking rates is limited by the soil quality of the land farmed. In 2015, three quarters of the most profitable Single Suckling enterprises farmed *very good* soils, whereas the proportion of the least profitable Single Suckling farms on very good soils was considerably lower at less than 25 percent.

The most profitable one third of Single Suckling enterprises in 2015 had an average gross output per hectare that was 135 percent higher than the average output per hectare on the least profitable one third of enterprises, while average direct costs per hectare were only 38 percent higher.

Cattle Finishing: The second cattle enterprise category analysed is the Cattle Finishing enterprise. The enterprises analysed were again ranked on the basis of gross margin per ha and assigned to three equally sized groups termed *least*, *average* and *most profitable*.

Average direct costs of production per hectare were highest on the most profitable farms and lowest on those farms with lower levels of profitability (see Figure 3). Total expenditure on concentrate feed is substantially higher on Cattle Finishing enterprises than on Single Suckling enterprises. The most profitable one third of Cattle Finishing enterprises had a gross output of €1,615 per hectare compared with €618 per hectare on the least profitable Cattle Finishing enterprises.

Figure 3: Variation in Total Production Costs and Gross Output on Cattle Finishing Enterprises in 2015

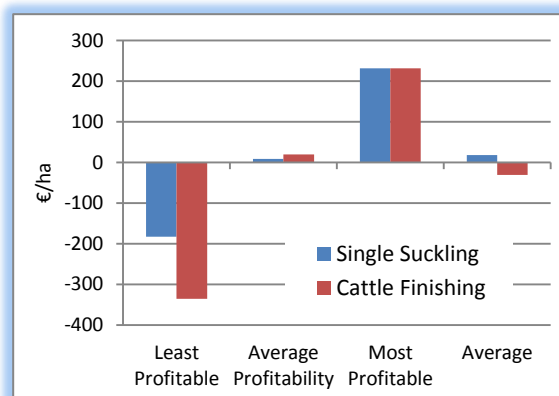


Source: 2015 Teagasc National Farm Survey (2016)

As with Single Suckling enterprises there is a large degree of heterogeneity in gross output per hectare across the Cattle Finishing enterprises analysed. This diversity reflects the differing levels of production intensity on these farms. The average stocking rate on the least profitable Cattle Finishing enterprises was 1.17 LU per hectare, while the average stocking rate on the most profitable one third of Cattle Finishing enterprises was 1.87 LU per hectare. In general more profitable Cattle Finishing enterprises were on farms with better soil, 80 percent of the most profitable Cattle Finishing enterprises farmed *very good* soils, while only 54 percent of the least profitable farms farmed very good soils.

The results presented in Figure 2 and Figure 3 highlight the differences in costs per hectare on Single Suckling and Cattle Finishing enterprises. However, it is important to recall that there is even greater variation in gross output across different farm enterprises. While higher levels of gross output per hectare are in general associated with high levels of direct costs of production and farming on better than average soils, the difference in technical performance and productivity between the top one third and bottom one third of Cattle Finishing enterprises remains striking.

Figure 4: Cattle Enterprise Net Margins per hectare in 2015



Source: Teagasc National Farm Survey (2016)

Average overhead costs per hectare on the Cattle Finishing and Single Suckling enterprises were €492 and €447 per hectare respectively (see Appendix Table A1 and Table A2 at the end of this paper). The higher level of overhead expenditure on Cattle Finishing farms reflects both the higher average intensity of production on these farms when compared with Single Suckling enterprises and

their higher average stock of non-livestock capital (buildings and machinery) per hectare.

The developments in the net margins earned by the Single Suckling and Cattle Finishing enterprises in 2015 matched that in gross margins. Positive net margin were earned on the average Single Suckling enterprise, while the scale of the average negative net margin earned on Cattle Finishing farms in 2015 was reduced due to higher finished cattle prices and somewhat lower costs of production. Figure 4 shows the net margins earned on the two cattle enterprises analysed and illustrates that in 2015 both the most profitable and average profitability one thirds of Cattle Finishing and Single Suckling enterprises earned positive net margins.

3. Estimated Performance of Irish Cattle Farms in 2016

This section of the paper presents a review of the economic performance of Irish cattle enterprises in 2016. A discussion of the estimated changes in input usage and input costs in 2016 is first presented and this is followed by a discussion of estimated changes in output value. Estimates of margins earned by Single Suckling and Cattle Finishing enterprises in 2016 are then presented. Estimates for 2016 and forecasts for margins in 2017 (which are presented in Section 4) are based on small increases in the intensity of production per hectare on both single suckling and cattle finishing farms. The impact of an increase in the intensity of production on individual enterprises would be expected to vary from enterprise to enterprise. In some cases it could increase profitability, in others it could give rise to lower margins. In 2016 and 2017 aggregate production of beef in Ireland is forecast to increase, while suckler cow inventories in 2016 are estimated to have increased relative to 2015.

3.1 Estimated Input Usage and Price 2016

3.1.1 Feedstuffs

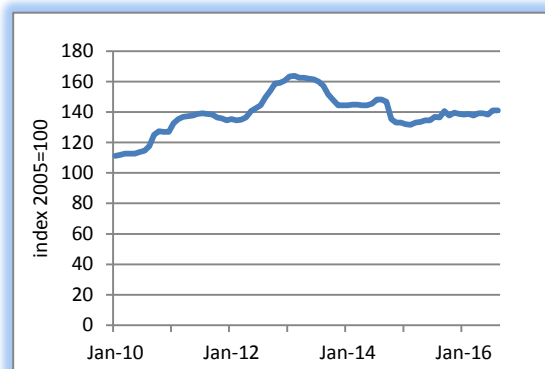
Purchased feed (concentrates) is an important element of the direct cost of beef production in Ireland. Typically this cost item accounts for approximately 30 percent of total direct costs on Single Suckling enterprises and 40 percent of direct costs on Cattle Finishing enterprises.

2016 was a normal year in terms of grass growing conditions and as a consequence the availability of

grass was not a major driver of changes in the volumes of feed stuffs purchased by Irish beef farmers. The aggregate volume of purchased feed used by Irish cattle farms in 2016 is marginally higher than in 2015. Overall, it is estimated that feed use per head is likely to be stable based on increases in Irish non-dairy cattle inventories largely matching the estimated increase in aggregate feed use in 2016.

Figure 5 presents the CSO monthly price index for cattle feed stuffs for the period January 2010 to September 2016. Cattle feed prices have remained largely stable through the first three quarters of 2016 and over the course of the full year cattle feed prices are estimated to remain largely unchanged relative to 2016.

Figure 5: Monthly Price Index of Cattle Meal in Ireland 2010 to 2016



Source: CSO (2016)

With largely unchanged average levels of feed purchased by cattle farms on a per hectare basis and stable feed prices, we estimate that expenditure on concentrates by Irish cattle farmers in 2016 will be unchanged as compared to 2015.

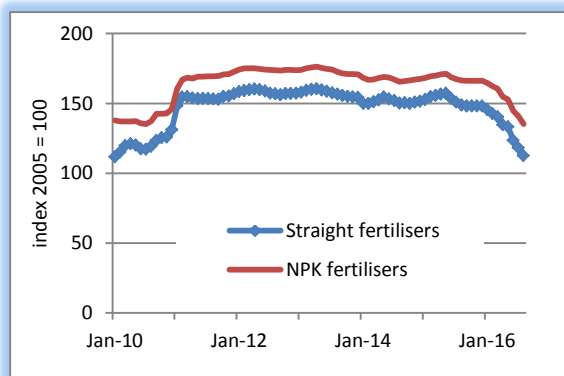
3.1.2 Fertiliser

Figure 6 presents data on fertiliser prices over the past seven years. Fertiliser prices have declined strongly over the course of 2016.

The declining levels of Irish fertiliser prices have contributed to reduction in direct costs of production on Irish cattle farms.

Despite the decline in fertiliser prices there has been no similarly dramatic change in the intensity of production on Irish cattle farms. Overall expenditure on fertiliser is estimated to have declined significantly in 2016 in line with reductions in the price of fertilisers.

Figure 6: Monthly Price Index of Fertiliser in Ireland from 2010 to 2016



Source: CSO (2016)

3.1.3 Energy and Fuel

In 2016 the average price for crude oil declined to close to \$30 per barrel (pb), but recovered through the year to close to \$50 pb. On average the US dollar price of oil was 17 percent lower in 2016 than in 2015. Given the relative stability in the euro/US dollar exchange rate the movements in dollar prices in 2016 has also been reflected in the change in euro prices. As a result of the change in oil prices and the inelastic nature of farmer demand for fuel, fuel expenditure on Irish cattle farms is estimated to have decreased by 12 percent in 2016 relative to the 2015 level. The smaller decrease in farm level fuel costs as compared to crude oil prices reflects the impact of taxes and other activity along the energy supply chain.

While no official data on contractor charges exists, based on industry provided information, we estimate that for 2016 farmer contracting charges will have remained largely unchanged as compared to 2015. When combined with reduced expenditure on fertiliser, this means that overall expenditure on pasture and forage by cattle farmers in 2016 is estimated to have declined significantly when compared to 2015.

Electricity costs change infrequently in Ireland due to energy price regulation. The relatively small change that has occurred during 2016 reflects the decline in the costs associated with electricity production and distribution in Ireland. On an annual average basis, prices in 2016 are estimated to have declined by 3 percent compared to 2015.

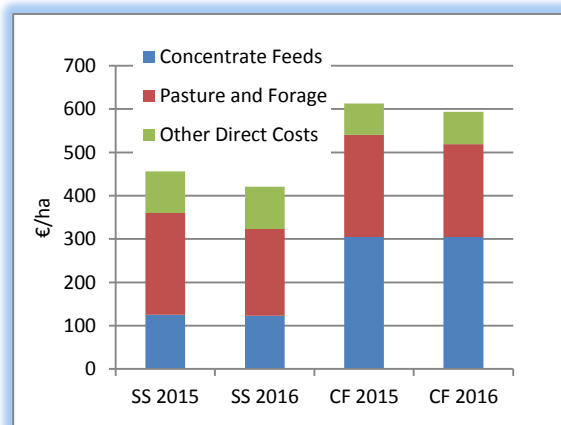
3.1.4 All Other Direct and Overhead Costs— usage and price 2016

Wages in Ireland are estimated to have increased 1 percent in 2016 due to the on-going recovery in the Irish labour market; however, given the low usage of hired labour on Irish cattle farms, this development does not have a major impact on costs of production. The price level of other direct costs is estimated to have increased by 3 percent in 2016. Given the nature of overhead costs, there is little capacity for changes in volume used, and therefore the change in expenditure on other fixed costs is estimated to also be 3 percent higher in 2016 compared to 2015.

3.1.5 Estimate of Total Direct Costs for 2016

Figure 7 compares the average direct costs of production for the Single Suckling and Cattle Finishing enterprises in 2015 with the estimated direct costs for 2016. Average total direct costs are estimated to have decreased in 2016, with total direct costs on Single Suckling enterprises declining by 7 percent and direct cost on Cattle Finishing enterprises estimated to have decreased by 5 percent. The larger reduction on single suckling enterprises is due to the greater importance of pasture and forage costs (largely fertiliser) in their direct costs of production. Overall, with little or no change in the volume of inputs used and, with lower fuel and fertiliser prices, overall costs of production in 2016 are estimated to have declined by 5 percent of Single Suckling farms and by 3 percent on Cattle Finishing farms.

Figure 7: 2015 Direct Costs and Estimated 2016 Direct Costs for Single Suckling (SS) and Cattle Finishing (CF) Enterprises



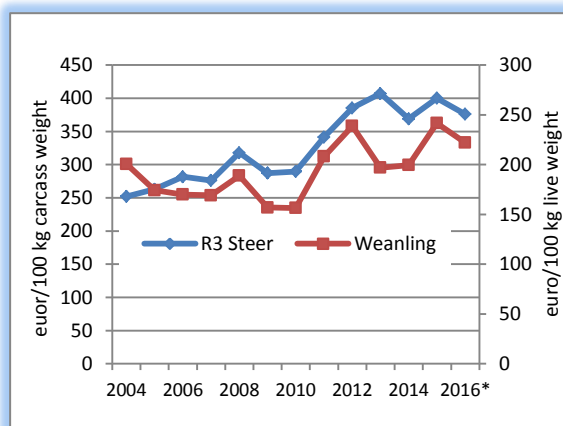
Source: Teagasc National Farm Survey (2016) and Author's Estimates

3.2 Estimated Output Values 2016

The value of gross output on Single Suckling enterprises is estimated to have declined in 2016, due to reductions in the average prices for all categories of cattle. Average weanling prices in 2016 are estimated to be 8 percent lower than in 2015. The estimated average R3 steer price for 2016 of around €380/100kg represents a 5 percent decline on the price level in 2015. The average decrease in young bull prices in 2016 largely mirrored that observed for steers, with prices in 2016 estimated to be approximately 6 percent lower than in 2015. Figure 8 presents average steer and weanling prices for the period 2010 to 2015 and an estimate for 2016.

The lower level of weanling and store cattle prices received by Single Suckling enterprises, indirectly offsets the negative impact of lower finished cattle prices on the value of output of Cattle Finishing enterprises. This arises because one of the costs incurred by cattle finishers is the cost associated with animal purchased in. This is reflected in our estimate that market output value on Cattle Finishing farms in 2016 has decreased by less than the headline decrease in finished cattle prices.

Figure 8: Irish Cattle Prices 2004 to 2016



Source: DG Agri. and CSO; * Author's estimate 2016.

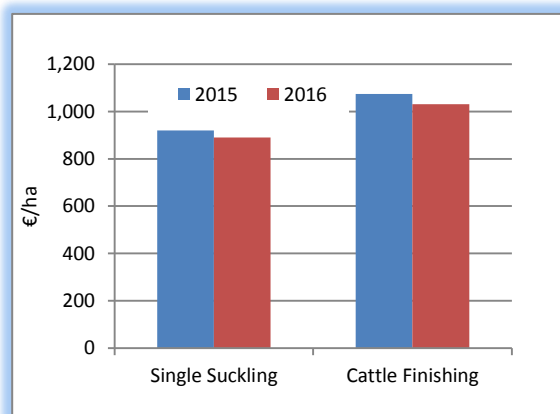
Gross output per hectare on Single Suckling farms in 2016 is estimated to have declined by 8 percent to €890 per hectare. The most profitable one third of Single Suckling enterprises, due to higher stocking rates and other factors, continue to achieve significantly higher output per hectare (€1,269 per hectare) as compared to the average (€835 per hectare) and least profitable (€572 per hectare) enterprise groups.

Gross output per hectare in 2016 was on average higher on Cattle Finishing enterprises than on Single Suckling enterprises. This largely reflects the

higher stocking density per hectare on these farms. The average level of gross output per hectare for Cattle Finishing enterprise in 2016 is estimated to be €1,031 (a decrease of 4 percent on the level in 2015).

In our estimates and forecasts for 2016 and 2017 we have incorporated the payments made to cattle farmers under the Government's BDGP. The payments under the BDGP are contingent on farmers undertaking specified measures, some of which will involve additional costs. Nevertheless, payments under the BDGP are still likely to add to participant's output value. However, not all farmers with suckler cows will be able or want to participate in the programme. Current information indicates that approximately 24,000 farms with 550,000 cows are participating in the programme. The BDGP has an annual budget of €52m. In our analysis the return per hectare in 2016 and 2017 is assumed to be €44 per hectare. For suckler farmers who actually participate in the programme the value per hectare of BDGP participation will be higher than the level assumed.

Figure 9: 2015 Gross Output for Single Suckling (SS) and Cattle Finishing (CF) Enterprises and Estimate for 2016



Source: 2015 National Farm Survey (2016) and Author's Estimates 2016

Again, as with Single Suckling enterprises, there is a large degree of variation in the value of gross output per hectare between the least profitable, average profitability and most profitable groups of Cattle Finishing enterprises. The most profitable Cattle Finishing enterprises are estimated to have produced an average level of gross output per hectare (€1,615 per hectare) that was 160 percent higher than the average value of output per hectare on the least profitable group of Cattle Finishing enterprises (€618 per hectare).

3.3 Beef Enterprise Margin Estimates for 2016

As shown in Figure 7, the estimated expenditure on concentrate feed by cattle enterprises was largely stable in 2016, while expenditure on pasture and forage costs was declined as a result of lower fuel and fertiliser costs. The resulting decrease in total direct costs partially offsets the negative impact of lower output prices on both Cattle Finishing and Single Suckling enterprises.

On single suckling enterprises the receipt of payments associated with participation in the BDGP and lower direct costs are sufficient to leave gross margins in 2016 largely unchanged compared to 2015. On cattle finishing enterprises gross margins are estimated to have declined in 2016

Single Suckling enterprises in 2016, as in 2015, are on average estimated to have earned a small positive net margin of 18 per hectare –though farmers that are not participating in the BDGP are likely to incur negative net margins. Cattle Finishing enterprises are estimated to have earned, on average, a negative net margin of -€47 per hectare.

Table A1 and Table A2 decompose the Single Suckling and Cattle Finishing population into 3 groups of equal number on the basis of profitability (gross margin per hectare) and presents estimates of gross output, direct costs, gross margin and net margin for 2016.

For the Cattle Finishing enterprise only the top one third of farmers is estimated to have earned a positive net margin. On Single Suckling enterprises only the top one third of enterprises are estimated to have earned positive net margins in 2016, while the average profitability group are estimated to have broken even on a per hectare basis. The negative net margins earned on the average Cattle Finishing enterprise and the very low to negligible profit on average single suckling farms, highlights the profitability challenges in Irish beef production that persist.

4. Outlook for 2017

In this section we forecast the expenditure for various input items, the beef price that is expected to prevail in 2017 and the incomes from the production of cattle in 2017.

4.1 The Outlook for Input Expenditure

4.1.1 Feedstuffs in 2017

Global cereal and oilseed futures market prices point to largely stable feed prices in 2017. Cereal and other feed ingredient input prices have not changed significantly in 2016 as compared to 2015. The 2017 harvest price for cereals and oilseeds will affect the price of feed in the back end of 2017. At this stage our forecast for world cereal and oilseed prices is for little change relative to 2016.

For 2017 our feed use forecasts are based on an assumption of normal grass growing conditions. This is likely to lead to little or no change in feed use in 2017. With cattle feed prices forecast to remain stable in 2016 and volumes used unchanged, our forecast is for no change in overall feed expenditure in 2017.

4.1.2 Fertiliser in 2017

The outlook for international fertiliser prices in 2017 is largely stable with developments in global supply and global demand expected to leave prices for most fertilisers close to current levels. This however will mean that as compared to the average level of fertiliser prices in 2016, prices in 2017 are forecast to be on average 5 percent lower than in 2016.

Fertiliser use on grassland farms was stable in 2016. In our 2017 forecast we assume that on average fertiliser use will also be unchanged relative to the 2016 level.

With slightly lower prices and unchanged usage our forecast for total expenditure on fertiliser is for it to fall in 2017 relative to 2016. With contracting charges not expected to change in 2017, total expenditure on pasture and forage by Irish cattle farmers in 2017 is forecast to decline by 4 percent relative to the 2016 level.

4.1.3 Energy and Fuel

An analysis of futures prices indicates that the balance of market opinion sees Brent crude oil prices averaging close to US \$52 pb for 2017 or €48 pb. This futures contract price, if reflected in spot prices through 2017, would represent an increase of 22 percent on the average 2016 level. We forecast that prices at the pumps as paid by farmers are likely to increase as a result by 10 percent in 2017 over and above the levels paid on average in 2016.

Electricity prices are not forecast to increase in 2017 despite the expected increase in petroleum based fuel prices. Irish electricity generation is increasingly based on energy sources other than oil and this is reflected in our forecast for 2017. With a forecast of stable electricity prices this should leave overall expenditure on energy and fuel on cattle enterprises up by approximately 9 percent in 2017 relative to the 2016 level.

4.1.4 Other Direct and Fixed Costs

Increases in the cost of labour are forecast for 2017 due to continuing growth in the Irish economy, however, on the average Irish cattle enterprises hired labour costs are very small and inflation in labour costs is not expected to have a major impact on costs of production. General inflation is likely to continue to be low and an increase in other direct costs of 3 percent with no volume change is assumed. Other overhead (fixed) costs are also forecast to increase by 3 percent in 2017 relative to their level in 2016.

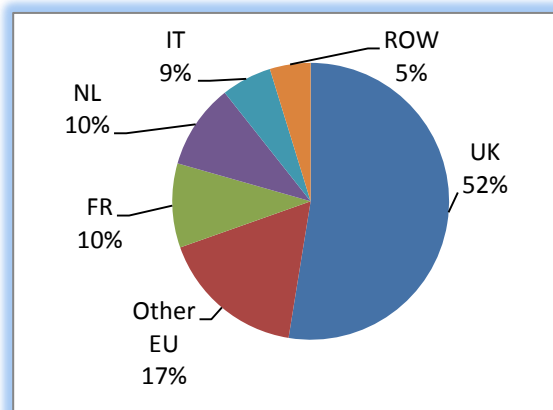
4.2 The Outlook for Cattle and Beef Markets 2017

Ireland exports close to 90 percent of its beef production and is the fifth largest net-exporter of beef in the world (CSO 2016c, USDA 2016). Conditions in markets to which Irish beef and cattle are exported largely determine Irish cattle prices; though supply developments in Ireland can cause Irish cattle prices to deviate from export market prices over the short run.

Figure 10 provides an estimate of 2016 Irish beef export destinations based on trade data for the year to the end of August 2016 and illustrates the continuing dominance of the UK in Irish beef exports and the relatively minor role of extra-EU markets in the current Irish beef export mix. This dominance largely reflects the recent relative profitability of the UK as an export destination. The UK has in recent years been one of the most lucrative beef market globally. Developments in the sterling exchange rate since the calling of the UK Brexit referendum have dramatically reduced the euro value of Irish beef exports to the UK market (relative to what they would have been if the referendum had not been called). Over the medium to longer term the introduction of any barriers to trade between the UK and Ireland (and other EU member states) will also be reflected in lower Irish cattle prices. In the short run, the depreciation of the pound sterling against the

euro, which occurred as a result of Brexit, will mean that the Irish beef exports to the UK are going to be less valuable in euro terms. This development will inevitably be reflected in lower cattle prices to Irish farmers.

Figure 10: Estimate of Irish Beef Export Markets by Volume in 2016



Source: Eurostat COMEXT, January to August (2016)

In the short run the outlook for finished cattle supplies and for beef supply in Ireland are determined by the current inventories of animals aged 1-2 years. Data from the Department of Agriculture, Food and the Marine AIMS database provide insights into developments in these inventories. Inventories for animals aged 18-24 months of age are considerably higher than in 2015, indicating that in 2017 supplies of finished cattle will increase relative to current (2016) levels.

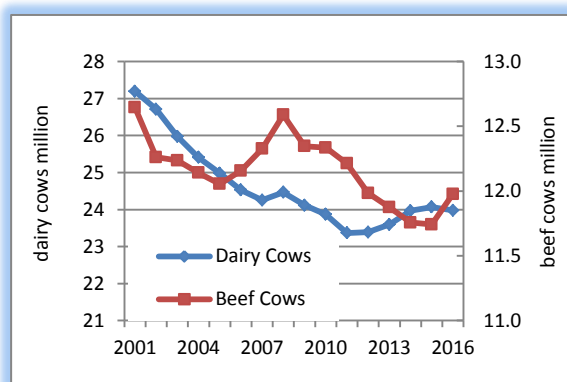
In the rest of the EU supplies of cattle for slaughter in 2017 are also likely to be higher than in 2016, though increased deliveries of prime cattle are likely to be partially offset by a reversion to lower levels of cow slaughter in 2017. Overall EU production of beef in 2017 will be higher than in 2016, and supplies of finished cattle in Ireland and beef production are over the full year likely to be higher than in 2016.

In the medium term (beyond 2017) inventories of breeding animals are the key determinant of beef supply. Figure 11 illustrates the recent trends in dairy and beef cow inventories in the EU (readers should note that the different scales on right and left axes). In anticipation of the abolition of milk quotas in April 2015 the numbers of dairy cows in the EU increased, however low levels of profitability in 2015 and 2016 have effectively halted and reversed this recent trend. Nevertheless with dairy cows now accounting for

more than two thirds of the stock of cows in the EU, the recent increases in EU dairy cow numbers and small increases in suckler cow numbers have meant that aggregate cow numbers in the EU in 2016 have increased on levels in 2015.

Under the CAP many member states have introduced coupled direct payments related to both numbers of dairy and suckler cows and these policy measures will mitigate the impact of on-going low levels of profitability on cow numbers. Over the medium term, however, the greater profitability of dairy production in the EU, when compared to suckler cow production, is likely to lead to an increase in the share of dairy cows in the total EU breeding cow stock. Developments in dairy production and dairy cow numbers will increasingly dictate the volume of EU beef production and specialised beef producers will increasingly see, in the post-quota world, their economic fortunes buffeted by developments in cattle supplies that originate in the dairy sector.

Figure 11: EU28 Cow Numbers (June) 2001 - 2016



Source: Eurostat

Given the increase in beef production forecast for the EU in 2017, the outlook for EU (and Irish) finished cattle prices depends importantly on the prospects for beef demand in the UK and the Eurozone, and on developments in the euro exchange rate with the pound sterling.

The macroeconomic outlook for the Eurozone is still one of positive, but low rates of economic growth. The forecast macroeconomic outlook for the UK, the Irish beef sector's largest export market, has deteriorated (HM Treasury, 2016). While the UK economy continues to grow, Brexit is expected to lead to lower rates of growth in 2017. With increasing beef production forecast in Ireland and the UK (AHDB, 2016), and EU production also

likely to be higher in 2017, the outlook for cattle prices is negative.

In 2017 increasing supplies are unlikely to be absorbed by strong growth in demand as income growth continues at only very low levels. Continuing competition from lower priced pig meat and poultry meat also continues to put downward pressure on beef prices. Our forecast is that EU and Irish cattle price will be lower in 2017 than in 2016. The forecast decline in Ireland of 12 percent is higher than that forecast for the EU, as a result of the negative impact on Irish cattle prices of the depreciation of sterling versus the euro. In our forecasts we have assumed that the current (early November 2016) exchange rate between the euro and sterling will prevail through all of 2017. Despite this stability assumption, given the decline in the value of sterling through the course of 2016, this will mean depreciation in 2017 relative to 2016 on an annualised basis.

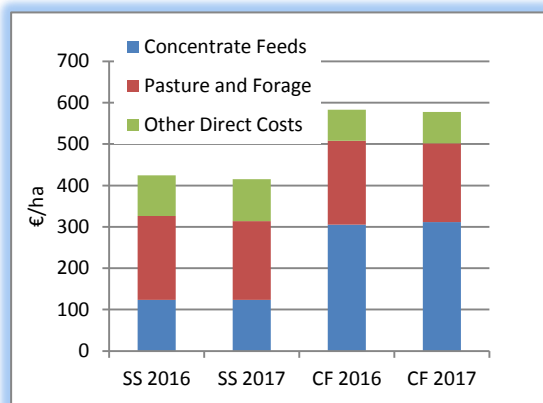
The forecast lower price of finished cattle is expected to be reflected in lower calf, weanlings and store cattle prices in Ireland. Our forecast is that younger cattle prices in 2017 will decline by 10 percent relative to 2016 levels.

4.2.1 Outlook for Beef Enterprise Net Margins in 2017

Figure 12 compares the estimated and forecast average direct costs per hectare in 2016 and 2017 for the Single Suckling and Cattle Finishing enterprises. With prices for cattle of all ages forecast to decrease in 2017, gross output on both Single Suckling and Cattle Finishing enterprises are forecast to contract on the estimated 2016 levels. With expenditure on feed forecast to be more or less unchanged in 2017 and pasture and forage expenditure costs expected to decline, margins earned on both Single Suckling and Cattle Finishing enterprises are forecast to deteriorate significantly on the levels estimated for 2016.

Gross margins for the Single Suckling enterprise are forecast to decline in 2017, with the 2017 level forecast to be 14 percent lower than that estimated to have been earned in 2016. The forecast decline in prices and output value outweighs the positive impact of forecast lower direct costs of production.

Figure 12: Estimated Direct Costs for 2016 and Forecast Direct Costs for 2017



Source: Author's Estimates 2016 and Forecasts 2017

The forecast decline in gross margin per hectare on Cattle Finishing farms in 2016 is 19 percent. For Cattle Finishing enterprises the forecast in finished cattle prices in 2017 is partly offset by the impact of lower young cattle prices that cattle finishers pay for cattle purchased in. As on Single Suckling enterprises, the forecast reductions in direct costs of production are insufficient to offset the negative impact of significantly lower output prices on Cattle Finishing enterprise gross margins.

The average net margin per hectare for Single Suckling enterprises in 2016 is forecast to be -€65, a major deterioration on the estimated positive net margin in 2015. Net margins on average on Cattle Finishing farms are also forecast to decline in 2017, with the forecast average negative net margin of -€151 also lower than the average negative net margin of -€47 per hectare estimated for 2016. The forecast average margins earned on the least, average and most profitable of the Single Suckling and Cattle Finishing enterprises in 2017 are presented in Table A3 and Table A4.

5. Concluding Comments

In 2016 the economic performance of Cattle Finishing and Single Suckling enterprises was dominated by developments in output prices rather than in costs of production. In 2016 Irish finished cattle prices declined as a result of the depreciation of sterling and weaker cattle prices in the EU. Prices for younger cattle in general declined by more than finished cattle prices. During 2016 stable feed prices and lower fertiliser prices left overall costs of production 4 to 5 percent lower than in 2015. These lower costs of production mitigated the negative impact of lower output prices on cattle enterprise gross margins.

The estimated gross margins earned in 2016 on Cattle Finishing enterprises have declined relative to 2015. In 2016 we estimate that the net margin earned on the average Single Suckling enterprise is positive and largely unchanged compared to 2015. This stability in Single Suckling gross margins is largely due to the receipt of payments associated with the BDGP. The estimated average net margin earned on the average Cattle Finishing enterprise in 2016 is negative with the increase in the magnitude of the negative margin largely mirroring the decline in gross margins earned.

The decline in Irish prices in 2016 was driven by lower EU prices, but also by the dramatic weakening of the pound/euro exchange rate. Our forecast for 2017 is for a more significant deterioration in Irish cattle prices. This pessimistic outlook is driven by increasing supplies of beef on the EU market and weak demand growth. Weaker world beef prices as the production cycles globally, with the exception of Australia, are reflected in increased production outside of the EU. The increasing supplies of beef in Ireland, the EU and globally are forecast to run ahead of growth in demand for beef as Irish, UK and Eurozone demand growth slows and low pig and poultry meat prices continue to erode the beef share of consumers' meat consumption. Developments in live exports to markets in the Mediterranean will be welcomed, they will not be sufficient to turn around the pessimistic price outlook for 2017.

Exchange rate developments in 2017 will have a major bearing on the extent to which the Irish price developments diverge from average EU price developments. Given Ireland's continued dependence on the UK market, a further weakening of sterling in 2017 could lead to an even more pessimistic outcome for Irish cattle prices. However, it should be noted that such a development while negative from an output value perspective would also likely lead to some offsetting decreases in some input prices.

The large forecast decline in gross and net margins in 2017 leaves them close to the levels observed in 2013. The lower levels of profit forecast for both Cattle Finishing and Single Suckling enterprises are close to the average of the period 2011-2015. The profitability of the average Single Suckling and Cattle Finishing enterprise, when decoupled direct payments are excluded, has for most of the recent past been negative. Cattle farmers' output value for most years (2015 and 2016 may have been

exceptional) has been less than total costs of production. While the top one third of both Single Suckling and Cattle Finishing enterprise often earn positive net margins, the average enterprise is generally failing to cover costs of production with the value of output sold. This on-going lack of profitability reflects the structure of the industry.

The price outlook for beef over the short term and arguably for the medium term is not positive. The largest market for Irish beef, the UK, has dramatically reduced in value as a result of changes in exchange rates. There seems little prospect of a return to 70p per euro level that prevailed for much of 2015. The prospect of changes to market access arrangements for Irish beef following a UK exit from the EU will mean that medium term returns from the UK market will decline. The challenge for the Irish beef industry will be to develop new markets for Irish beef that can begin to reduce the dependence on the UK market that has traditionally been Ireland's second "home" market.

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Table A1: 2015 and Estimated 2016 Financial Performance per hectare: Single Suckling Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2015	1,338	858	569	920
Direct Costs 2015	544	428	396	456
<i>Concentrate Costs</i>	151	113	111	151
<i>Pasture and Forage Costs</i>	270	226	208	270
<i>Other Direct Costs</i>	123	89	77	123
Gross Margin 2015	788	432	178	464
Overhead Costs 2015	771	526	384	446
Net Margin 2015	232	9	-183	-18
Gross Output 2016	1,269	835	572	886
Direct Costs 2016	508	398	368	424
<i>Concentrate Costs</i>	149	111	109	123
<i>Pasture and Forage Costs</i>	234	195	180	203
<i>Other Direct Costs</i>	125	91	79	98
Gross Margin 2016	762	438	204	466
Overhead Costs 2016	575	437	373	448
Net Margin 2016	187	0	-03	18

Source: Teagasc National Farm Survey Single Suckling Enterprise Fact Sheet 2015 (Teagasc NFS, 2016a) and Authors' Estimates 2016

Table A2: 2015 and Estimated 2016 Financial Performance per hectare: Cattle Finishing Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2015	1,615	998	618	1,074
Direct Costs 2015	726	548	564	613
<i>Concentrate Costs</i>	356	224	332	305
<i>Pasture and Forage Costs</i>	278	247	182	235
<i>Other Direct Costs</i>	92	77	77	73
Gross Margin 2015	889	450	54	461
Overhead Costs 2015	657	430	390	492
Net Margin 2015	232	20	-336	-31
Gross Output 2016	1,550	958	593	1,031
Direct Costs 2016	690	516	540	583
<i>Concentrate Costs</i>	356	224	332	305
<i>Pasture and Forage Costs</i>	240	214	157	203
<i>Other Direct Costs</i>	94	79	51	74
Gross Margin 2016	859	368	66	448
Overhead Costs 2016	672	440	399	495
Net Margin 2016	187	-72	-3333	-47

Source: Teagasc National Farm Survey Cattle Finishing Enterprise Fact Sheet 2015 (Teagasc NFS, 2016b) and Authors' Estimates 2016

Table A3: Forecast 2017 Single Suckling Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2017	1,168	768	526	821
Direct Costs 2017	477	372	344	419
<i>Concentrate Costs</i>	147	110	108	123
<i>Pasture and Forage Costs</i>	202	169	156	195
<i>Other Direct Costs</i>	128	93	80	101
Gross Margin 2017	691	397	183	402
Overhead Costs 2017	594	452	386	467
Net Margin 2017	97	-55	--203	-65

Source: Author's forecast 2017

Table A4: Forecast 2017 Cattle Finishing Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2017	1,423	879	544	946
Direct Costs 2017	690	514	542	582
<i>Concentrate Costs</i>	363	228	339	311
<i>Pasture and Forage Costs</i>	230	204	151	195
<i>Other Direct Costs</i>	97	81	53	76
Gross Margin 2017	733	365	3	364
Overhead Costs 2017	700	458	416	516
Net Margin 2017	32	-93	-413	-151

Source: Author's forecast 2017

Irish Sheep Farming in 2015



Irish Sheep Slaughter
2.833 million head (0%)



Stocking Rate
(Mid Season Lowland)
average of 7.4 ewes/ha (down 3%)



Irish lamb Slaughter
2.512 million head (up 1.5%)



Weaning Rate
(Mid Season Lowland)
average of 1.3 lambs/ewe



Live Exports
0.032 million head (down 32%)



Lamb Mortality
(Mid Season Lowland)
average of 7%



Irish Ewe Numbers
2.468 million (down 1%)



Lambs Weaned/ ha
(Mid Season Lowland)
average of 10 lambs/ha



Lamb price
average €470/100kg (up 2%)



Lamb Carcass per head
average 20.0 kg (up 1.6%)



Total Production Costs
(Mid Season Lowland)
average €127 per ewe (down 9%)



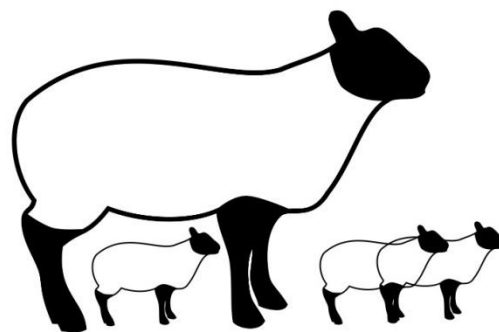
Total Production Costs
(Mid Season Lowland)
average €907 per hectare (down 13%)



Gross Margin
(Mid Season Lowland)
average €73 per ewe (down 15%)



Net Margin
(Mid Season Lowland)
average €6 per ewe (down 54%)



Source: Teagasc National Farm Survey and Central Statistics Office

Irish Sheep Farming in 2016



Stable output prices
in spite of unfavourable
sterling rate



Lamb Slaughter
down 3%



Lamb prices
stable



Weather Conditions
Not as good as 2015



Grass Availability
Good



Fertiliser Prices
down 15% on 2015 level
Fertiliser Use
little changed on 2015 level



Feed Prices unchanged
Feed use up 2%



Other Direct Costs
up 4% on the 2015 level



Fuel prices
down 12% on the 2015 level



Total Input Costs
Overall, input costs slightly
lower than in 2015



Gross Margin per ha
(Mid Season Lowland Lamb)
€545 (up 3% on the 2015 level)



Irish Sheep Farming in 2017



Lower output prices
competition from other meats
slows demand growth



Lamb Slaughter
unchanged



Lamb prices
down 5% on 2016 level



Weather Conditions
normal weather assumed



Grass Availability
Similar to 2016



Fertiliser Prices
down 5% on 2016 level
Fertiliser Use
little changed on 2016 level



Feed Prices unchanged
Feed use unchanged



Other Direct Costs
down 1% on the 2016 level



Fuel prices
up 10% on the 2016 level



Total Input Costs
Overall, input costs up 3% on
the 2016 level



Gross Margin per ha*
(Mid Season Lowland Lamb)
€568 (up 4% on the 2016 level)



* Margins in 2017 will benefit from the Sheep Welfare Payment

Source: Teagasc Estimates for 2016 and Forecasts for 2017

Review of Sheep Farming in 2016 and Outlook for 2017

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1. Introduction

For this paper, data from farms in the Teagasc National Farm Survey (NFS), which have a mid-season lowland lamb enterprise, are used. This information, together with data from Bord Bia, the Central Statistics Office (CSO), European Commission DG Agri and Eurostat, is used to analyse the financial performance of Irish sheep farms. Estimates of enterprise margins for 2016 are based on 2015 Teagasc NFS data (Hennessy and Moran 2016) and CSO price indices for the year to date (CSO, 2016b) and preliminary estimates for 2016 (CSO, 2016c). Forecasts for sheep enterprise margins for 2017 are based on our estimates of margins for 2016, and forecasts of input and output price and volume changes in 2017.

We begin the paper with a brief review of the outturn for family farm income (FFI) for the Teagasc NFS *mainly sheep* farms in 2015. A detailed assessment of the 2015 mid-season lowland lamb enterprise margins is then presented in section 3. This is followed by an overview of the current short term outlook for European and Irish sheep markets in section 4. Estimates and forecasts of margins for the lowland mid-season lamb enterprise for 2016 and 2017 are then presented in sections 5 and 6. The mid-season lowland lamb enterprise is the predominant lowland sheep system in Ireland. In our analysis we have limited the sample analysed to those enterprises with more than 20 breeding ewes.

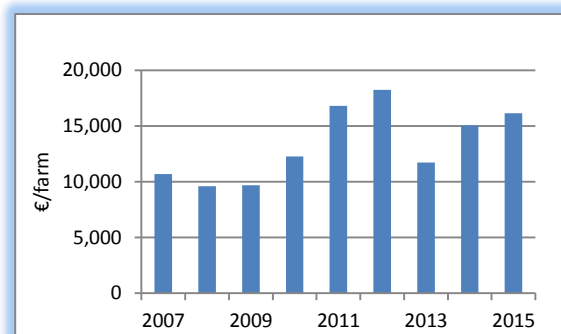
National policy in relation to the sheep sector, namely the *Sheep Grassland Scheme*, operated between 2010 and 2014. This scheme boosted sheep enterprise margins over that period. Implementation of the June 2013 CAP reform agreement in Ireland in 2015 has led to the incorporation of the Sheep Grassland Scheme's payment within the decoupled direct payment (the Basic Payment) received by sheep farmers. Consequently the contribution of this payment to enterprise output is very low in 2015 and disappears in 2016. In Budget 2017 €25 m was allocated to a new Sheep welfare scheme (DAFM, 2016a). In this analysis we have assumed that this

payment, that will be paid on a per ewe basis, will be worth €10 a ewe, which at an average stocking rate of approximately 7 ewes per hectare is equivalent to circa €70 per hectare. .

2. Review of the Economic Performance of Sheep Farms in 2014

FFI on those farms classified by the Teagasc NFS as *mainly sheep* farms increased strongly in 2014, with FFI on sheep farms increasing by over 28 percent on the previous year. The average FFI earned on these farms for the period 2007 to 2015 are shown in Figure 1. Readers should note that the narrowing of the Teagasc NFS sampling frame in 2012 is likely to have affected the average level of FFI on Irish sheep farms as measured by the Teagasc NFS. Some of the growth in FFI over the period since 2011 may be attributable to the sample change rather than to fundamental changes in the profitability of Irish agriculture.

Figure 1: Average Income on Mainly Sheep Farms in Ireland: 2007 to 2015



Source: Teagasc National Farm Survey (2016)

The increase in FFI on sheep farms in 2015 was not due to a large increase in sheep output, the value of output on Irish sheep farms did not change dramatically in 2015, though the decoupling of the sheep grassland payment from production will have reduced sheep enterprise output. Readers should note that the mixed nature of most Irish sheep farms means that developments in non-sheep enterprise profitability also affects the income performance of mainly sheep farms. In 2015 strong increases in Irish cattle prices and profitability (see Hanrahan, 2016) drove most of

the improvement in farm income on Mainly Sheep farms.

In the remainder of this paper we focus exclusively on the mid-season lamb enterprise as the unit of analysis. This allows us to isolate the impact of developments in sheep output prices and related costs of production on profitability of Irish sheep production.

3. Sheep Margins in 2015

Changes in the value of output, costs and gross margin per hectare for the mid-season lowland lamb enterprise in 2015 are shown in Table A1 of the Appendix to this paper. The value of gross output for mid-season lamb enterprises in 2015 declined due to slightly lower lamb prices over those that prevailed in 2014 and a decline in the volume of lamb produced on most farms due a decline in the stocking rate of ewes per hectare. Gross margins in 2015 declined relative to 2014, as a result of this lower output value, with lower expenditure on direct costs of production insufficient to totally offset the impact of lower output and the incorporation of the Sheep Grassland Payment in the Basic Payment.

In 2015 total direct costs per hectare on the average mid-season lamb enterprise declined by 6 percent. This decrease in direct costs was due to decreases in pasture and forage costs (driven by lower expenditure on fertiliser) and lower other direct costs. Expenditure on concentrates in 2015 increased relative to 2014.

Large differences in the profitability of sheep farms operating the mid-season lamb system continue to persist, and reflect continuing differences in the intensity of production and farm management performance. For comparison purposes, in Table A2 mid-season lowland lamb enterprises are ranked on the basis of gross margin per hectare, and assigned to three equally sized groups which we have termed *least*, *average* and *most* profitable. The average levels of output, direct costs and gross and net margin per hectare and indicators of technical performance across these three groups can then be compared.

The most profitable one third of mid-season lamb enterprises earned an average gross margin of €912 per hectare in 2015, while farms in the bottom group earned an average gross margin of only €328 per hectare. This means that the top producers earned, on average, almost 3 times

more per hectare than their counterparts in the bottom group. The large differences in gross margin earned per hectare reflect differences in intensity of production, but also differences in direct costs per hectare (see Table A2). Total direct costs per hectare are greatest on the group with the highest level of profitability reflecting the higher stocking rate on these farms.

The large differences between the values of output per hectare between the three groups of farms are due to differences in weaning and stocking rates. Higher levels of technical performance are reflected in the average carcass output per hectare of 241 kg on the most profitable mid-season lamb enterprises, versus 151 kg on the least profitable enterprises.

When direct costs of production per kilo of lamb carcass produced are compared, the impact of different levels of production intensity per hectare can be taken into account. Direct costs of production per kilo of lamb carcass produced on the least profitable farms are almost 100 percent higher than the costs per kilo incurred on the most profitable of the mid-season lamb enterprises.

The average net margins for midseason lamb enterprises declined in 2015. The average net margin earned on the mid-season lamb enterprises analysed in 2015 was €60 per hectare. As the data in Table A2 show, the large variation in gross margin earned per hectare is also reflected in variation in the net margins earned.

4. Sheep Meat Markets: Short run outlook

The bulk of Irish lamb output is destined for foreign markets and in 2015 over 83 percent of Irish lamb production was exported (CSO, 2016d). This means that anticipating lamb price developments for Ireland's export markets is critical in determining the prices that Irish sheep farmers will receive for their output in 2017. The relative prices of competing meats (beef, pig and poultry meat) will also have an impact on demand for Irish lamb, both in Ireland and on export markets, and hence also affect the prices for lamb that Irish sheep farmers receive.

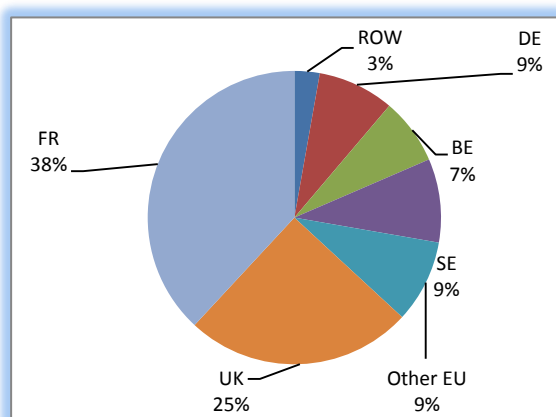
Though continental EU markets account for the majority of Irish lamb exports, the UK market remains important for Irish exports. UK lamb, together with non-EU imports (mostly sourced from New Zealand and Australia), also compete

with Irish lamb on Continental EU and UK markets. The UK in 2016 accounted for an estimated 25 percent of Irish sheep meat exports as illustrated in Figure 2. As a consequence the depreciation of the pound sterling also has had a negative impact on Irish lamb prices.

Aggregate EU demand for lamb had been contracting in recent years, however in 2015 consumption grew modestly and the European Commission's latest forecasts are for consumption of sheep meat to stabilise in 2017 (EC, 2016). The outlook for the Eurozone macroeconomy in 2017 is weak but positive, and economic growth will mean that per capita demand for lamb in 2017 is unlikely to be significantly different from that in 2016. This stable European demand outlook, combined with developments in sheep supply, both within the EU and on the world market and expected price developments for competing meats will determine the short-run outlook for European (and Irish) lamb prices.

The outlook for the supply of sheep meat within the EU is forecast to be stable in 2017. Some growth in heavy lamb output in Ireland and the UK is forecast but lower production is expected from some continental markets. Irish ewe numbers on the basis of the June 2016 CSO livestock survey (CSO, 2016a) are once again growing modestly, though higher levels of ewe slaughter in 2016 as compared to 2015 are indicative of a stable beginning breeding inventory in 2017.

Figure 2: Irish Sheep and Lamb Meat Exports (Volume) by Destination in 2016



Source: Eurostat COMTRADE database, year to August.

The indigenous production of lamb in the EU in 2017 will largely be a function of the 2016 ending inventory of breeding ewes. Total EU ending inventories of ewes in 2016 are forecast to be largely stable. The UK sheep breeding flock in June

2016 increased only marginally over the equivalent level in 2015 (AHDB, 2016). Continental EU inventories of breeding sheep and lambs available for slaughter in 2017 are also likely to be stable with contraction in production in some member states offset by increases in supply from others.

Beef and Lamb New Zealand (B&LNZ, 2016) expect New Zealand lamb shipments in 2016 to be down by 2 percent on the level in 2015 due to the on-going contraction in the New Zealand sheep flock.. Australian lamb exports are also expected to decline in 2017. ABARES is forecasting that Australian lamb exports in 2016/17 will decrease by 1 percent (ABARES, 2016), while mutton exports are forecast to drop dramatically from the high levels of recent years that have reflected the running down of breeding inventories that occurred as a result of the recent drought. With improved pasture conditions Australian sheep farmers are expected to retain lambs for breeding purposes and defer ewe slaughter in 2017.

In 2017 the EU supply of sheep meat is expected to be stable while imports are not expected to grow. Other things equal, the outlook for European and Irish lamb prices in 2017 should be positive. Per capita demand for sheep meat, which had contracted since the onset of the Eurozone recession in 2011, has grown in 2015 and modest growth is expected in 2016 and 2017 (EC, 2016). However, the strong depreciation of the pound sterling versus the euro and the forecast decline in EU beef prices mean that the price of lamb on Irish and EU markets is likely to decline in 2017. The UK is the largest lamb producer in the EU and is Ireland's principal competitor on the French market. The weaker pound sterling will put downward pressure on the price Irish exports to the French market can expect to receive in 2017. Our forecast is that lamb prices in 2017 will decline by 5 percent on the 2016 level.

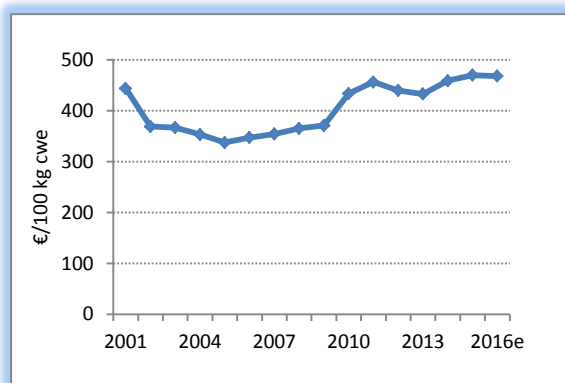
5. Estimated Sheep Gross Margins 2016

To obtain an estimate of farm profitability for 2016, it is necessary to estimate the volume and price of inputs likely to have been used in producing lambs, as well the volume and value of the lamb produced. In our estimates for 2016 (and forecasts for 2017) we have assumed that stocking rates per hectare and weaning rates are unchanged from the observed 2015 levels. An increase in the intensity of lamb production, such as for example an increase in the number of ewes stocked per hectare or in the numbers of lambs per

ewe, would change both the costs of production per hectare and the gross output per hectare. Such changes could lead to improvements in enterprise profitability. There are most likely also farms for which an increase in stocking rates could lead to lower profits.

The EU sheep and lamb market in 2016 was characterised by very modest growth in imports and indigenous supplies of EU sheep meat. This increase in supply was absorbed by growth in EU demand. With growth in demand matching growth in supply, EU sheep meat prices have been largely stable in 2016 as compared to 2015.

Figure 3: Irish Lamb Price, 2001 – 2016



Source: European Commission DG AGRI and author estimate 2016

Irish lamb prices in 2016 were marginally lower than those in 2015 (see Figure 3). Overall the value of market based gross output per hectare for the mid-season lamb system in 2016 is estimated to have remained largely unchanged from the level in 2015 with some increase in the volume of output as a result of growth in carcass weights.

The main direct costs of production for Irish sheep farms are purchased feed, pasture and forage costs. Overall input costs are estimated to have declined in 2016, with lower pasture and forage costs largely responsible for the 3 percent contraction in direct costs in 2016.

Purchased feeds typically account for 40 percent of total direct input expenditure on the average mid-season lowland lamb system. Over the course of 2016 purchased sheep feed prices are estimate to have remained largely unchanged. In 2016 with normal grass growing conditions feed use is not estimated to have changed significantly relative to 2015. Department of Agriculture, Food and the Marine data for the first three quarters of 2015 (DAFM, 2016b) indicate that total sales of sheep

feed were over 12 percent higher, in volume terms, than in the same period in 2015. It is difficult given the largely unchanged volume of sheep inventories and sheep disposals in 2016 to fully account for why such an increase has arisen. Rather than assume that these increased sales are reflected in equivalent increases in feed use per hectare we have assumed that feed use per hectare has risen by 2 percent to reflect the higher average slaughter weights in 2016 as compared to 2015. Given the stable price of sheep feed in 2016 and the small increase in volumes of feed used, expenditure on concentrates is estimated to have increased by 2 percent in 2015.

Pasture and forage costs typically account for approximately 30 percent of total direct costs on the mid-season lowland lamb system. Fertiliser prices have declined significantly in 2016, with prices estimated to have fallen by 15 percent in 2015 (CSO, 2016a, 2016b). Fertiliser sales data from the Department of Agriculture, Food and the Marine (DAFM) indicate that the volume of fertiliser sales in 2016 is on a par with 2015. We estimate that fertiliser applications by Irish sheep farmers have remained largely unchanged in 2016. Contracting charges in 2016 are not thought to have changed, and overall we estimate that expenditure on pasture and forage in 2016 decreased by 14 percent.

In 2016 total direct costs of production on the mid-season lowland land enterprise are estimated to be lower than in 2015. Slightly increased expenditure on concentrates has been more than offset by reduced expenditure on pasture and forage while other direct costs of production have increased; overall direct costs of production have declined by almost 3 percent. With output value slightly higher in 2016 due to higher slaughter weights, the gross margin earned on the average lowland mid-season lamb enterprise in 2016 is estimated to have increased by 3 percent to €545 per hectare (see Table A3).

6. Outlook for the Sheep Enterprise Gross Margin in 2017

Despite the forecast stability in aggregate European lamb supplies in 2017, a tightening global supply situation, and relatively stable per capita demand for sheep meat on EU markets, Irish and EU prices in 2017 are forecast to decline. The principal driver of this forecast reduction in Irish and EU lamb prices is the depreciation of the UK currency relative to the euro and developments in

the market price of competing meats (particularly beef).

The outlook for input prices in 2017, from the perspective of Irish sheep farmers, is broadly positive. Forecast decreases in the prices of some key inputs (such as fertiliser) are unlikely to be fully offset by increases in other input prices.

Concentrate costs are the largest direct cost item for mid-season lowland lamb enterprises and prices of concentrates are forecast to remain stable in 2017, with volume of feed use forecast to be unchanged in 2017 relative to 2016, total expenditure on concentrates is expected to remain unchanged.

The price of fertiliser is forecast to decline in 2017. Despite energy price inflation forecast for 2017, contractor charges are expected to be largely stable. Overall, pasture and forage costs on Irish lowland mid-season lamb enterprises are forecast to decline by 4 percent in 2017.

Table A3 summarises our forecasts of output, costs and margins for the mid-season lamb enterprise for 2017. Given the negative outlook for lamb prices in 2017, and the forecast lower direct costs of production forecast, the average gross margin earned from sheep farming would be expected to decline. However the introduction of a coupled sheep welfare payment is forecast to effectively offset the negative impact on output value of lower lamb prices in 2017 and result in higher gross margins in 2017.

The gross margin per hectare for the mid-season lamb system in 2017 is forecast to be €568, a 4 percent increase on our 2016 estimate.

On the basis of our analysis of future contract prices for crude oil, fuel costs are expected to increase in 2017. Other fixed costs are also forecast to increase in 2017, so that total overhead costs on the mid-season lamb enterprise will be expected to increase in 2017.

With the impact on output value of lower lamb prices largely offset by the new sheep welfare payment, marginally higher total costs of production have resulted in average net margins per hectare from sheep production that are forecast to decline only marginally to €67 per hectare in 2017.

7. Concluding Comments

The average gross margin earned by mid-season lamb producers in 2016 is estimated to have increased modestly relative to that earned in 2015. Stable lamb prices, with some increase in output volume per hectare, and slightly lower direct costs of production boosted margins.

Output prices in 2017 are likely to be lower than those observed in 2016. Despite a stable demand and supply balance for lamb in the EU in 2016, and tighter global markets for sheep meat due to reduced exports from Australia and New Zealand the weaker pound sterling/euro exchange rate as well as strong declines in beef prices will leave EU and Irish prices lower in 2017.

Our forecast is that gross margins earned by the average mid-season lamb enterprise in 2017, despite the negative price outlook in Ireland of -5 percent, will increase relative to that estimated for 2016. This benign outlook is as a result of the introduction of the coupled sheep welfare payment in 2017 of €10 per ewe. The gross margin earned in 2017 is forecast to be €568 per hectare, an increase of 4 percent from the estimated gross margin in 2016. Despite higher gross margins, average net margins are not forecast to increase due to increases in overhead costs, with the average mid-season lamb enterprise forecast to earn a net margin of €67 per hectare in 2017 which is slightly lower than that estimated for 2016.

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The authors would like to thank the staff and recorders of the National Farm Survey for their assistance in conducting the analysis contained in this paper, industry contacts who provided valuable feedback on input market developments and Agricultural Economics and Farm Surveys Department colleagues who provided valued criticism. Any errors or omissions remain the sole responsibility of the authors.

Table A1: Average Mid-Season Lamb Output, Direct Costs, Gross Margin and Technical Performance

	2015	2016e
	€/ha	
Gross output	967	972
<i>Sheep Grassland Scheme Payment</i>	9	0
Direct Costs	439	427
<i>Concentrates</i>	191	195
<i>Pasture and Forage costs</i>	140	121
<i>Other direct costs</i>	108	111
Gross Margin	528	545
Overhead Costs	468	476
Net Margin	60	70
Ewes/ha	7.4	7.4
Lambs per ewe	1.3	1.3
Lamb Carcass (kg)/ha	193	193

Source: Teagasc National Farm Survey and Authors' estimates for 2016

Note: In calculating the volume of lamb carcass output per hectare an average carcass weight of 20 kg has been used (Hanrahan, 2006)

Table A2: Mid-Season Lamb Output, Costs, Margins and Technical Performance in 2015 by gross margin grouping

	Most Profitable	Average Profitability	Least Profitable
	€/ha		
Gross Output	1319	914	672
Direct Costs	407	400	510
<i>Concentrates</i>	148	158	268
<i>Pasture and Forage</i>	146	140	126
<i>Other Direct Costs</i>	113	102	117
Gross Margin	912	515	162
Net Margin	350	79	-245
Ewe/ha	8.36	7.13	6.62
Lambs/ewe	1.44	1.26	1.14
Lamb carcass (kg)/ha	241	180	151
Dir. costs €/kg carcass	1.69	2.23	3.38

Source: Teagasc National Farm Survey

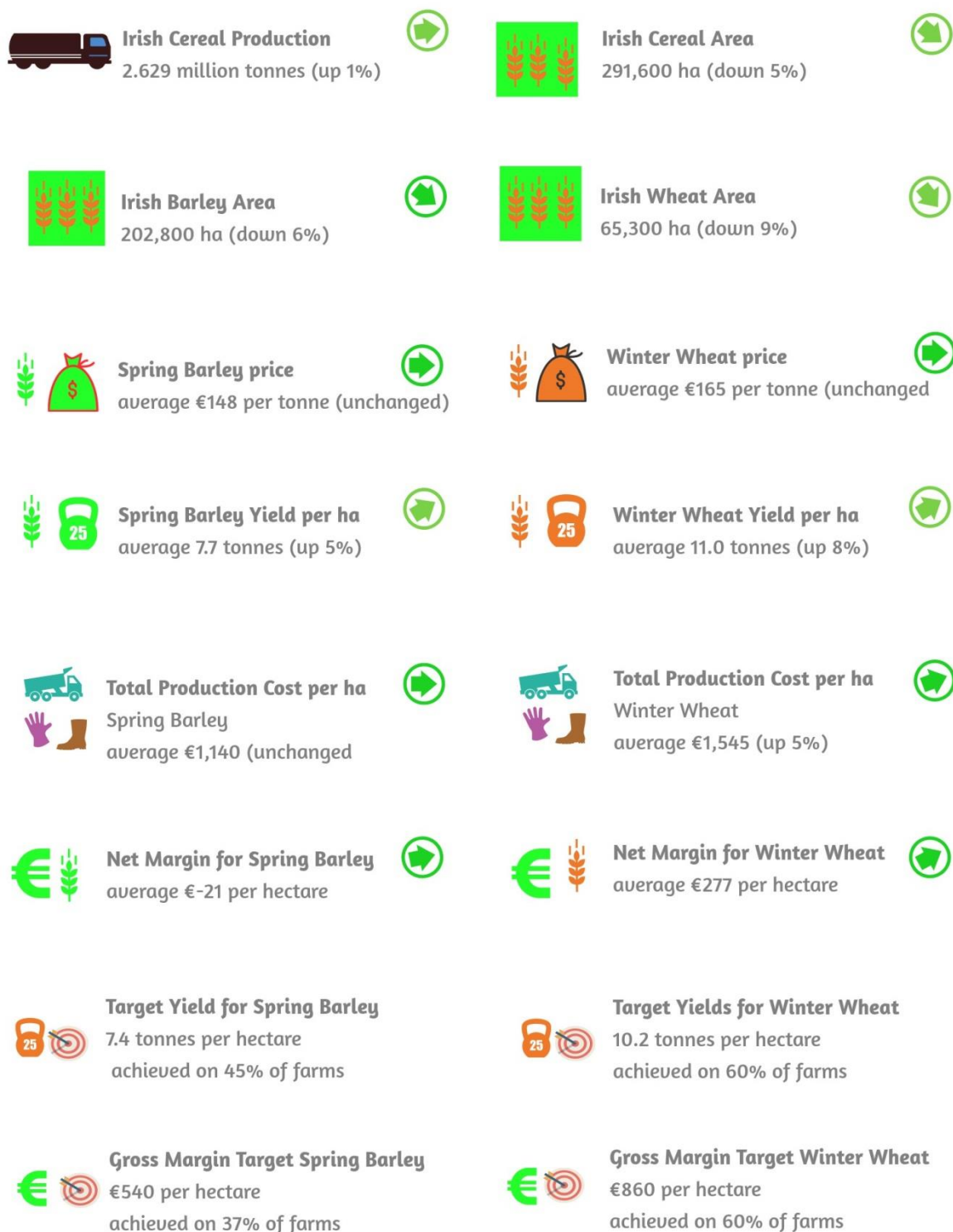
Note: In calculating the volume of lamb carcass output per hectare an average carcass weight of 20 kg has been used (Hanrahan, 2006).

Table A3: Average Mid-Season Lamb Enterprise Costs, Output, Gross and Net Margin, 2015 – 2017

	2015	2016 ^e	2017 ^f
	€/ha		
Total Direct Costs	439	427	425
<i>Concentrates</i>	191	195	195
<i>Pasture and Forage</i>	140	121	116
<i>Other Direct Costs</i>	108	111	115
Gross Output	967	972	924
Sheep Grassland Payment	9	0	70
Overhead Costs	468	476	501
Net Margin	60	70	67


Source: Teagasc National Farm Survey. ^e Estimate, ^f Forecast

Irish Cereal Farming in 2015




Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cereal Farming in 2016


 **Higher Global Cereal Production**
Another good international harvest

 **Irish Cereal Yields**
down 12% for wheat and 8% for s. barley vs. 2015 level


 **Barley and Wheat prices**
down on 2015 level

 **Weather Conditions**
Unfavorable, particularly in West at harvest time

 **Fertiliser Prices**
down 5% on 2015 level
Fertiliser Use
little changed on 2015 level

 **Seed Prices**
unchanged on the 2015 level

 **Other Direct Costs**
up 4% on the 2015 level


 **Fuel prices**
down 12% on the 2015 level


 **Total Direct Costs**
Overall, input costs slightly lower than in 2015

 **Gross Margin (Spring Barley)**
down €115 per ha on the 2015 level

 **Net Margin (Average Cereal Enterprise)**
€-130 per ha


Irish Cereal Farming in 2017

 **Lower Global Cereal Production**
reversion of yields to normal levels

 **Irish Cereal Yields**
down 2% for w. wheat and up 1% for s. barley vs. 2016 level

 **Cereal prices**
up 8% on the 2016 level


 **Weather Conditions**
Normal weather assumed

 **Fertiliser Prices**
down 15% on 2016 level
Fertiliser Use
little changed on 2016 level


 **Seed Prices**
down 5% on the 2016 level

 **Other Direct Costs**
up 4% on the 2015 level

 **Fuel prices**
up 10% on the 2015 level

 **Total Direct Costs**
Overall, input costs to decrease slightly on 2016 level

 **Gross Margin (Spring Barley)**
up €110 per ha on the 2015 level

 **Net Margin (Average Cereal Enterprise)**
€-30 per ha

Source: Teagasc Estimates for 2016 and Forecasts for 2017

Review of Tillage Farming in 2016 and Outlook for 2017

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1. Introduction

Harvest prices in the cereals sector in 2016 were generally lower than those achieved in 2015. In addition yields for the majority of Irish cereal crops were significantly lower than those achieved at harvest 2015. Taken together these developments resulted in lower gross output value in 2016 than in 2015. There are however some cost reductions in 2016, with most direct costs decreasing slightly.

The downward movement in cereal prices in 2016 was associated with several factors, the most important of which was an increase in the production estimates for crops in key producing countries. Higher production globally resulted in an increase in stocks and a less constrained global supply and demand balance in 2016/17.

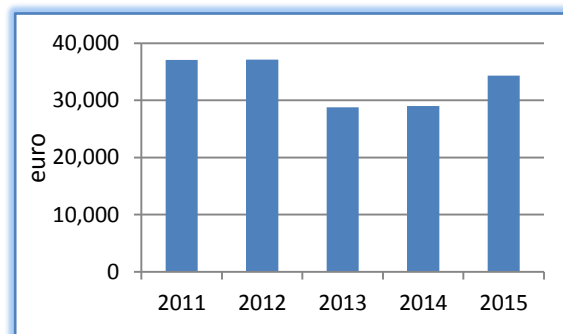
This paper will consider whether the price decreases of the 2016 harvest can be considered atypical or whether prices will continue at these levels into the 2017 harvest. The paper uses Irish Teagasc National Farm Survey (NFS) data to conduct a review of the financial performance of tillage farms in 2015. Following this, prices and costs are estimated for 2016 and these are used to produce an estimate of net margin for the 2016 harvest year. In the concluding sections of the paper, forecasts for 2017 are presented.

2. Review of the Economic Performance of Tillage Farms in 2015

Approximately 5,000 mainly tillage farms were represented by the NFS in 2015. Income on tillage farms increased by 18 per cent on the 2014 level. Market based gross output increased by 2 per cent from 2014 to 2015, while direct payments decreased by 8 per cent. Cattle gross output increased significantly on tillage farms by approximately 16 per cent, but the output of crops fell by 3 per cent. Overhead costs declined more significantly on tillage farms than other farm systems, as expenditure on fuel, a relatively important input for tillage farms, fell by 26 per cent. These changes resulted in an average family farm income (FFI) in 2015 of €34,303 which is equivalent to a 8 percent increase on the average

FFI on tillage farms over the previous three year average.

Figure 1: Average Income on Irish Specialist Tillage Farms 2011 to 2015*

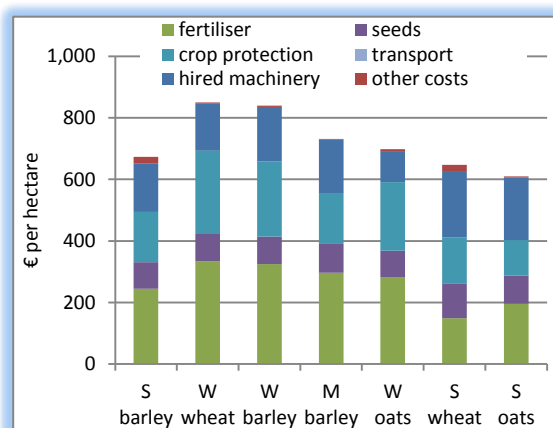


Source: Teagasc, National Farm Survey (various years)

*Adjustments have been made to the sample to reflect change in sample selection post 2011.

To understand the economic performance of tillage farms in 2015, we begin with a review of the cost and return structure of the main cereal crops using NFS data. Figure 2 disaggregates the direct 2015 costs of production for the principal cereal crops grown on Irish farms.

Figure 2: Composition of Direct Costs for Cereal Crops, 2015

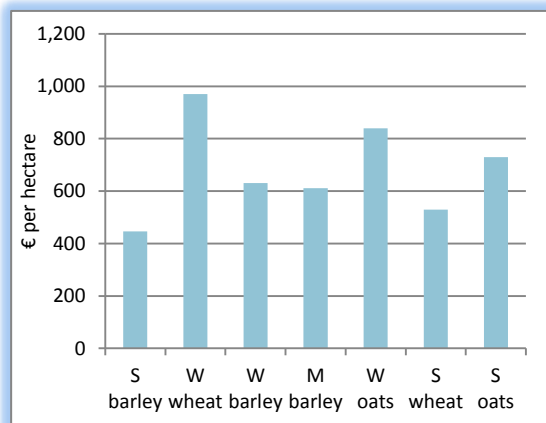


Source: Teagasc, National Farm Survey

Figure 2 shows that in general, direct costs are higher for winter sown crops compared to spring sown crops, due to the higher fertiliser and crop protection costs incurred in growing winter crops. However, given that yields are generally higher in winter sown crops, the more appropriate

comparative economic indicator is gross margin per hectare which is shown in Figure 3.

Figure 3: Gross Margins per ha for Cereal Crops, 2015



Source: Teagasc, National Farm Survey Data

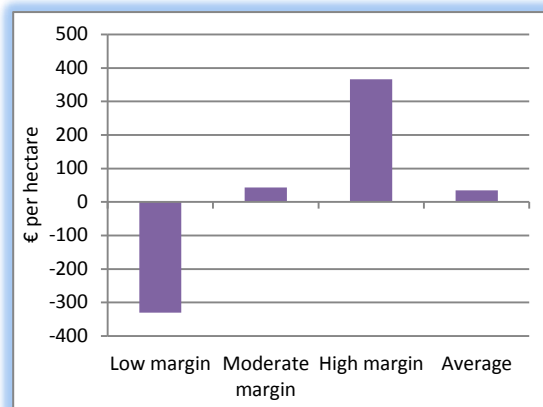
Figure 3 shows that the average gross margin per hectare for all winter crops is higher than the gross margin for equivalent spring sown crops. Winter wheat recorded the highest and spring barley the lowest margin of all cereal crops examined in 2015 (see Table A1 in the appendix to this paper for further details). The gross margin for the two main cereal crops, spring barley and winter wheat were increased in 2015 relative to 2014. Spring barley gross margins increased in 2015 relative to 2014 by 10 per cent, while gross margins on winter wheat farms increased by 5 per cent in 2015 relative to 2014.

While gross margin estimates are useful for comparative purposes, it is also worthwhile to examine the shift in net margin over time. However, for cereal crops it is particularly difficult to allocate overhead costs and straw output to individual crops using NFS data. For this reason, the net margin of the cereal enterprise of the entire specialist tillage farming population within the NFS is examined, and this is shown in Figure 4.

To examine the variation in net margins earned by tillage farms the sample was classified into three groups. Farms were classified on the basis of net margin per hectare; the best performing one third of farms are labelled high margin, the middle one third are moderate margin and the poorest performing one third of tillage farms are classified as low margin. The variation in margins across Irish tillage farms is readily apparent from Figure 4. The net margin for the cereal enterprise per hectare on high margin farms in 2015 was €366 per hectare

compared to €43 on moderate margin farms and -€330 per hectare on low margin farms. It is important to remember that these margins include production output only; hence by definition the Single Farm Payment (SFP), which is decoupled from production, is not included in these figures.

Figure 4: Cereal Enterprise on Specialist Tillage System Farms: Net Margin Distributions, 2015



Source: Teagasc, National Farm Survey Data

3. Estimate of 2016 Performance

This section of the paper presents a review of the cereal sector in 2016. To provide an estimate of enterprise margins for the current year, it is necessary to estimate the volume and price of inputs that are likely to have been used as well the volume and value of outputs produced in 2016. The ensuing sections of the paper discuss first, the movements in input prices and usage and second, the cereal market conditions, harvest yields, and production in 2016.

3.1 Estimated Input Usage and Price 2016

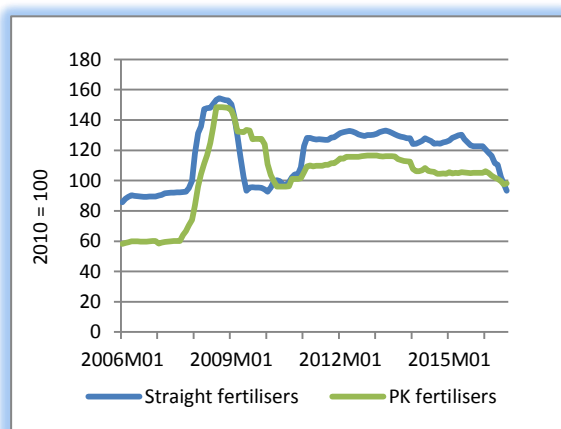
3.1.1 Fertiliser – Usage and Price 2016

In the early half of the last decade fertiliser costs typically comprised about 25 percent of direct costs and just over 10 percent of total costs on tillage farms. However, as illustrated in Figure 5, fertiliser types commonly used on tillage farms have increased substantially in price since 2006. The price increases in recent years have meant that expenditure on fertilisers now represents a larger proportion of costs on tillage farms than previously, albeit with some decline in 2015 and 2016; in 2015 fertiliser costs represented about 34 per cent of direct costs on tillage farms and around

17 per cent of total costs. In particular the price of natural gas which is a key determinant of fertiliser price, was the major driving force behind the upward trend for fertiliser prices through the second half of the 2000s. Increased demand and relatively fixed production capacity was also a factor.

However, following the peak in 2008 and 2009, the pressure on fertiliser prices has been mixed in more recent years, but with significant downward pressure on prices arising in 2016. Whilst there was a significant decrease in fertiliser prices in 2016 on a calendar year basis, relative to 2015, seasonality of purchase and application has an influence on overall expenditure for tillage farms. On a calendar year basis, straight nitrogen based fertiliser products are estimated to be down by about 18 percent whereas P & K fertiliser products are estimated to be down by only 5 percent. It is estimated here that for the 2015/16 harvest year NPK fertiliser prices were down by about 5 per cent for winter cereal crops, whereas spring crop compounds were down by about 8 per cent.

Figure 5: Irish Farm Gate Price Index of Fertilisers 2006 to 2016



Source: Central Statistics Office data for 2000 to 2016.

The pattern of fertiliser purchases on cereal farms is somewhat different from that on grassland farms, with applications being spread throughout the sowing and growing season from September of one year to May or June of the following year, depending on whether the crop is spring or winter sown. On this basis, it is sometimes the case that the fertiliser prices for cereal crops for a calendar year can be somewhat different to that experienced for grassland systems over the production year. During 2016 the story for fertiliser price differentials between cereal and grassland farms has been that price decreases were more

significant on grassland than cereal farms due to the timing of the price drop and also due to use of different fertiliser products.

On the usage side, DAFM figures indicate that fertiliser purchases in the 2016 fertiliser year (October 2015/September 2016) were not very different from those seen in 2015. Given that the DAFM figure on fertiliser purchases refers to all fertiliser purchases for grassland and cropland it was necessary to consult with farm advisors and industry sources to evaluate the magnitude of change in fertiliser usage levels for Irish crop farms. Reports from a number of sources indicate that fertiliser usage per hectare in 2016 was similar to the levels recorded in 2015, with the increase in winter crops at the expense of spring crops, compensating the overall decline in cereal area experienced in 2016. Hence, in per hectare terms (per crop) it is estimated that 2016 usage of fertiliser was similar to that applied in 2015. With no change in fertiliser usage on crop farms (per hectare) in 2016 and downward movement in fertiliser prices, overall expenditure per hectare on fertiliser in 2016 is estimated to have decreased but probably not to the same extent as the expenditure decrease on grassland farms.

3.1.2 Seed – Usage and Price 2016

Expenditure on purchased seed on crop farms comprises between 10 and 17 per cent of direct costs for cereal and oilseed production. In terms of the composition of total costs, seed represented 5 per cent of total costs in 2015. In 2016, cereal farmers did not experience any major shift in seed costs relative to the previous year due to virtually no movement in the prices for the main cereals at harvest 2015. In Autumn 2015 when seed supplies were purchased for the 2016 harvested winter crops, blue label seed cost were trading at about €475 per tonne. This price was also evident in 2016 for spring sown crops.

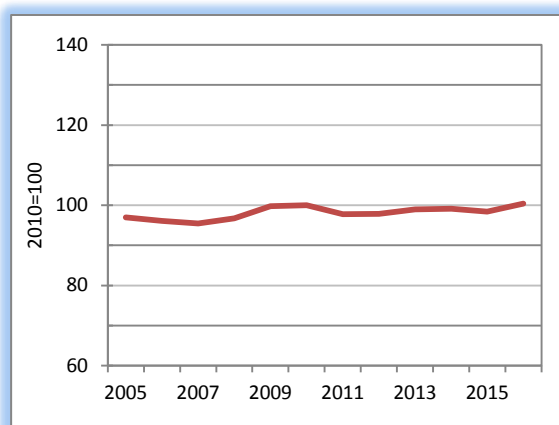
3.1.3 Crop protection – Usage and Price 2016

The expenditure on crop protection by specialist tillage farms in 2015 accounted for 21 percent of direct costs and 11 percent of total costs. However, the contribution of crop protection to the composition of costs can vary significantly depending on the crop; the percentage spent on crop protection for winter crops is higher than that for spring crops. For example for the winter wheat crop in 2015, crop protection costs accounted for

32 percent of direct costs as compared to 24 percent for spring barley.

Compared to other significant costs on tillage farms, the increase in the prices of crop protection products listed by the CSO has been limited over the recent past. Figure 6 shows that the increase in the costs of crop protection products from 2005 to 2016 was less than 5 per cent and that between 2015 and 2016 costs are estimated to have increased by about 2 percent.

Figure 6: Price Index of Plant Protection products in Ireland 2005- 2016



Source: Central Statistics Office and Author's own estimates

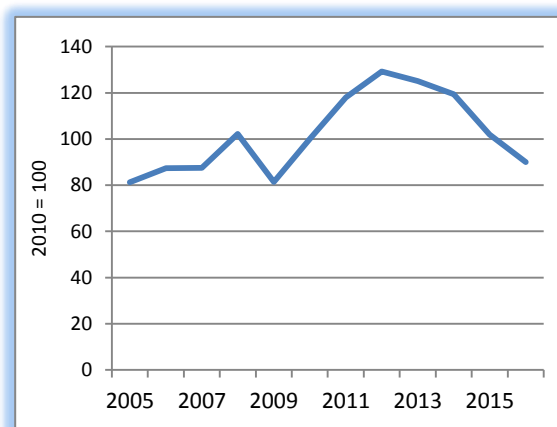
3.1.4 Energy and Fuel – Usage and Price 2016

Energy and fuel are important inputs in crop production. Given that a number of direct and overhead costs are directly influenced by energy and fuel prices the trend in energy prices is of significance for tillage farmers. In this analysis it is assumed that hired machinery and transport costs, which are a component of direct costs, and fuel and lubricants which are components of overhead costs, are directly influenced by energy inflation. These cost items represented approximately 16 percent of total costs on tillage farms in 2015.

Based on the CSO estimates presented in Figure 7, the farm level price of fuel has increased by over 25 percent between 2005 and 2015 (the last full year for which data is available). Between 2015 and 2016 as a result of a large decrease in Brent crude oil prices, and virtually no movement in US dollar to Euro exchange rate, the overall story for fuel prices paid by Irish tillage farmers in 2016 is a 12 per cent reduction relative to 2015. This is the fourth year in a row that fuel prices have declined. This estimate is based on a comparison of the

agricultural motor fuel index from the CSO for 2015 and the first eight months of 2016. For winter and spring sown crops the decrease in energy prices is estimated at around 12 per cent. Demand for these input items tends to be relatively inelastic with respect to price and therefore it is assumed that usage in 2016 will be similar to the 2015 level. Overall expenditure on fuel related items is likely to be 12 per cent lower in 2016 relative to 2015.

Figure 7: Price Index of Fuel products in Ireland 2005 – 2016



Source: Central Statistics Office and Author's own estimates

3.1.5 All other direct and overhead costs – Usage and Price 2016

Based on CSO estimates for the first eight months of 2016 compared to the same time period in 2015 it is assumed that 'other direct costs' within agriculture have increased by 4 per cent.

The average cost of land rental in 2015 on specialist tillage farms represented just under 6 per cent of total costs. Despite the fact that farm gate cereal prices did not change in 2015 there was anecdotal evidence that land rents per hectare increased in 2016 relative to 2015. While the convention is to assume that land rental prices react strongly to changes in cereal prices, NFS data indicates that cereal price inflation/deflation is not translated in its entirety into land rental charges. Hence, despite the stagnation in cereal prices in 2015, it is assumed that the average land rental per hectare increased by about 5 percent in 2016. Much of this inflation in rental prices per hectare in 2016 can be attributed to the need to maintain hectares to claim direct payments and demand for additional land from the dairy sector in particular. The methods employed here reflecting costs per crop hectare sown do not allow for changes in the

volume of land rented, and any changes on a total farm basis will only be fully reflected in the final Teagasc, NFS figures for 2016.

3.1.6 Estimate of Total Input expenditure for 2016

Total expenditure on all input items is estimated to have decreased in 2016 relative to 2015, but probably not to the same extent as that witnessed on grassland farms due mainly to seasonality of fertiliser purchases. The most significant decrease in expenditure occurred on energy related input items, which are estimated to have decreased by about 12 per cent between 2015 and 2016. On average, however the estimated decrease in total direct costs was approximately 2 per cent in 2016 relative to the 2015 level.

Figure 8A: Direct Costs in Winter Cereal Crops on in Ireland 2015 and Estimates for 2016

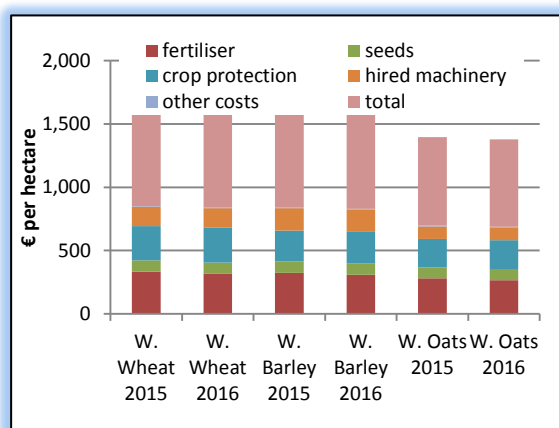
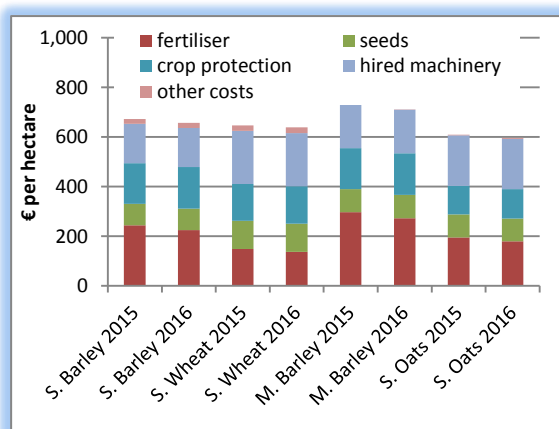


Figure 8B: Direct Costs in Spring Crops Ireland 2015 and Estimates for 2016



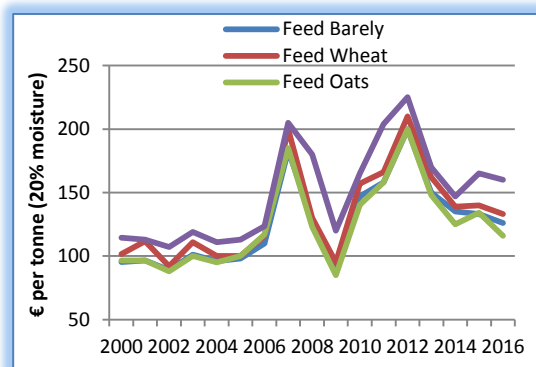
Source: Teagasc, National Farm Survey Data and Author's estimates for 2016

3.2 Estimated Output Values 2016

3.2.1 Price, yield and moisture levels in 2016

Unprecedented volatility has been witnessed in cereal prices in Ireland since 2006, with prices reaching a historical high in nominal terms in 2012. In 2013 and again in 2014, year on year farm gate cereal prices decreased considerably. In 2015, there was not as much movement in cereal prices, with some increasing slightly, whilst others decreased slightly. In 2016 ensuing from bumper harvests internationally farm gate feed wheat, barley and oat prices at 20 per cent moisture (paid at harvest time) were down on 2015 levels (as shown in Figure 9). Across most major crops it is estimated that on account harvest prices for cereals in 2016 were only down by about 5 percent on 2015 levels, with merchants in some cases paying loyalty bonuses to customers based on minimum purchase levels.

Figure 9: Farm Gate Cereal Prices (major crops), 2000-2016



Source: Teagasc, National Farm Survey Data and Author's estimate for 2016.

While the majority of cereals in Ireland are still sold off farm at harvest time to a grain merchant on a green moisture basis, the ability of farmers to forward sell grain has introduced an additional element to the calculation of the average price received by farmers. A special survey conducted by the Teagasc NFS in 2011 examined the proportion of the 2011 cereal harvest which was forward sold by farmers. This research indicated that approximately 25 per cent of total cereal production in 2011 was forward sold by farmers. However, the experience of the 2012 harvest, where harvest prices were well in excess of forward contract prices in many cases, had a negative effect on the numbers of farmers willing to engage in forward contracts in recent years.

Hence, it is assumed that in 2016 less than 10 per cent of total cereals were forward sold.

Market data shows that, on average, those farmers that forward sold in 2016 received a higher market price than those that waited until harvest time to agree a price. However, as noted earlier, it is estimated that the number of farmers engaged in forward contracting in 2016 was much less than in previous years.

Table 1: Average Yields Levels, 2015 and 2016 Harvest

	Yield (tonne per ha.)	
	2015	2016
Winter Wheat	11.0	9.7
Winter Barley	10.2	8.4
Winter Oats	9.2	8.4
Spring Wheat	8.6	8.2
Spring Barley	7.7	7.1
Spring Oats	7.7	6.7

Source: CSO (2016) & Forthcoming Teagasc Harvest Report (2016)

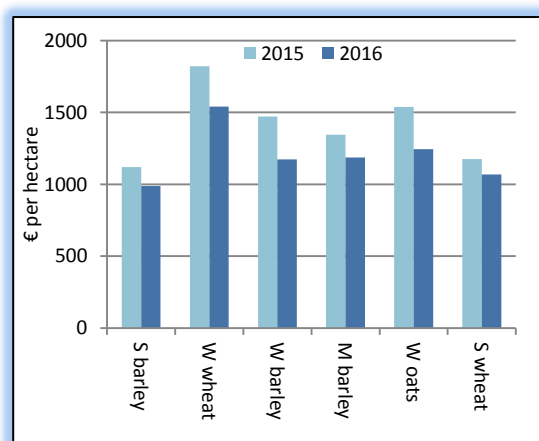
Table 1 shows the average green yields obtained in 2015 and 2016. In general for the 2016 harvested crops the yields are estimated to be lower than 2015. Grain quality was also mixed with low hectolitre weights in many winter barley crops and skinning (loss of some of the grain hull) reported in malting barleys. Weather conditions in some regions were also very unfavourable at harvest with many crops in these regions labelled as 'salvage operations'. Hence, for all of the major crops, yields in 2016 were below 2015 levels. However, readers should note that these yields are green yields and are not adjusted for moisture content.

The last variable which must be assessed in calculating cereal output value per hectare is the value of straw. Following from the decrease in yields for major cereal crops it is therefore not surprising that there were reports of decreased straw yields at harvest time, but there were only moderate increases reported at harvest time for the prices received. Since harvest time there have been further reports of price increases but how much of that will be translated into farm income is hard to say at this point, with a lot of straw sold off the field at harvest time. Taking yield and price into account, it is estimated that straw returns in 2016 were about 5 percent higher than in 2015.

3.2.2 Estimate of Total Output Value for 2016

Given the large number of variables that need to be considered in estimating output value, as outlined above, the estimated changes in crop output value between 2015 and 2016 are very crop specific. However, in overall terms, the general trend has been a decrease in output value in 2016 relative to 2015. This decrease arises due to the fall in cereal prices and yields. Output value per hectare in 2016 is estimated to have decreased by between 10 and 20 per cent depending on the crop examined.

Figure 10: Actual Gross Output per Hectare 2015 & Estimated Gross Output per Hectare 2016



Source: Teagasc, National Farm Survey Data and Author's estimates for 2016

3.2.3 Estimate of Total Production 2016

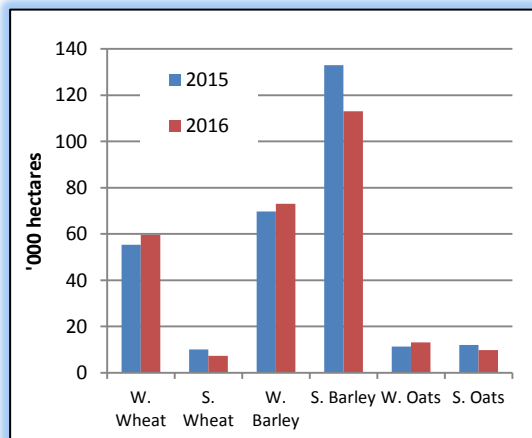
The figures presented in section 3.2.2 provide estimates of output value per hectare. However, these estimates do not take into consideration changes in area devoted to cereal crops in 2016. Figure 11 shows the area estimates for 2016 based on Teagasc Harvest Report data (forthcoming December 2016).

Figure 11 shows that the total area devoted to cereal production decreased by 5.4 percent in the 2015/16 crop year compared to the 2014/15 crop year. There was also some switching between winter and spring sown crops which was weather related.

Table 2 combines actual total cereal production for 2015, as reported by the CSO, with estimated total cereal production for 2016. The estimated 2016 production of wheat, barley and oats is based on

2016 yield estimates from the Teagasc harvest report. Overall cereal production is estimated to be down very slightly by approximately 401,000 tonnes or 15 percent on 2015 levels.

Figure 11: Change in Irish Crop Area from 2014/2015 to 2015/16 crop year in Ireland



Source: CSO and Teagasc, Teagasc Final Harvest Report 2016

Table 2: Actual & Estimated Production 2015 & 2016 ('000 Tonnes)

	2015	2016	%Change
Wheat	695	640	-8%
Barley	1736	1410	-19%
Oats	198	179	-10%
Total	2629	2229	-15%

Source: CSO and Teagasc, Teagasc Final Harvest Report 2016

3.2.4 International Production Estimates for 2016

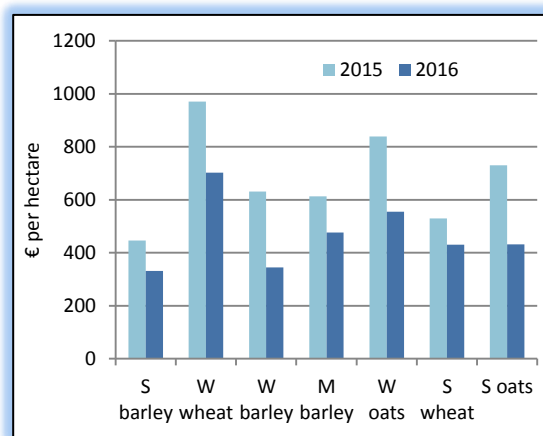
While production estimates for Irish cereals are important from a national supply, demand and balance sheet perspective, it is primarily developments in the international supply and use balance for cereals that affect price developments in Ireland. For this reason a review of the international ending stocks for cereals is more informative when near term price developments are concerned. The IGC and *Strategie Grains* estimates (Strategie Grains, November 2016) show that global total grain production and carry out stocks for 2016/17 marketing year to be up on the previous year's levels.

3.3 Review of Tillage Enterprise Margins in 2016

The review of cereal output value showed that the average value of output received by farmers was

lower in 2016 compared to 2015. The review of input costs concluded that total direct costs were only slightly down in 2016 than in 2015, despite significant declines for year on year averages for fertiliser and fuel in particular. However, due to seasonality of production and purchases, most of these declines in direct cost items are not estimated to have had a large effect on direct costs on tillage farms. Figure 12 presents the effect of these estimates on the estimated gross margin for each of the main Irish cereal crops.

Figure 12: Actual Gross Margin in 2015 & Estimated Gross Margin for 2016 for each of the Main Cereal Crops

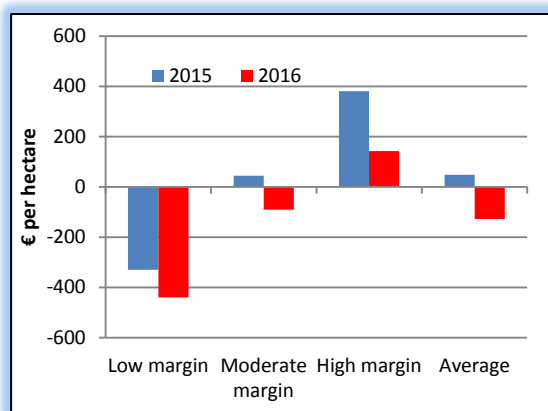


Source: Teagasc, National Farm Survey Data and Author's estimates for 2016

Figure 12 shows a clear story in terms of the change in gross margin in 2016 relative to 2015. The relative shift in yields between 2015 and 2016 has had the biggest effect on margins, with the decrease in cereal yields resulting in an overall decrease in gross margins for all crops examined. In terms of the major crops, the gross margin for Spring barley is estimated to be down by about €100 per hectare, while the margins for the other main crops, winter wheat and winter barley, are estimated to down by more than €250 per hectare respectively. It should be noted that the average gross margin figures presented above are market based gross margins and therefore exclude all decoupled payments and do not include overhead costs.

The estimated net margins for 2016 are presented for the average cereal enterprise on specialist tillage farms, with the NFS sample disaggregated into one-third groupings based on net margins per hectare obtained.

Figure 13: Actual Net Margin 2015 and Estimated Net Margin for 2016 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2016

Figure 13 shows the cereal enterprise net margin estimates for 2016 relative to 2015, for the average specialist tillage farm, in addition to the net margins for the low, moderate and high margin groupings of tillage farms.

The estimate of net margins for the typical cereal enterprise in 2016 is lower than in 2015 given downward movement in gross margins per hectare and only slight downward movement in fuel related overhead costs items, with all other overhead cost items experiencing an increase in 2016. For the best performing one-third of tillage farmers the estimated net margin for 2016 was €142 per hectare, and for the moderate margin farmer the net margin was negative at -€90 per hectare. It is important to remember that these figures exclude direct payments. Furthermore, it is important to note that owing to the methods employed in this estimation, changes in cropping choice or area cannot be fully captured and will only be realised when the final Teagasc, NFS figures are available for 2016.

4. Outlook for 2017

In this section forecasts are provided for the expenditure for various input items in 2017, the likely farm gate cereal price that will prevail at harvest 2017 and the likely net margin of tillage farmers in 2017.

4.1 The Outlook for Input Expenditure

4.1.1 Fertiliser – usage and price 2017

A number of factors need to be considered when forecasting price and volume changes for fertiliser on crop farms for 2017. CSO official monthly price indices for fertilisers for 2016 are only available up until the end of September; these data indicate a price reduction in N based products in particular over the last few months of the 2016 fertiliser year. However, as explained above much of this price reduction came too late in the season to benefit cereal costs to any large extent. Market report data coming from the fertiliser industry at present does not point to any major movements in stock balances in 2017. The International Fertiliser Association (2016) forecasts a '*soft balance in the short term*' for nitrogen products, with a '*stable surplus*' for phosphate and a '*short term equilibrium for potash*'. All of the language used is indicating that demand and supply factors will move in tandem to result in not much movement in fertiliser prices in the short term. However, there are some market sources indicating that the price of N based products in particular could move off the prices observed at the end of September 2016 due to price pressure from the supply side. Taking all of these issues into account, including seasonality of purchases, this is forecast to translate into approximately a 15 percent reduction in fertiliser price for cereal crops in 2016/17.

Fertiliser usage in 2017 is expected to be on a par with 2016 levels, given that for agronomic reasons the scope for reduction in use in response to higher fertiliser prices is limited for cereal farmers. Overall, it can be expected that fertiliser expenditure will be about 15 per cent lower per hectare on cereal farms in 2017 relative to the 2016 level.

4.1.2 Seed – usage and price 2017

As mentioned previously in the paper, cereal farmers experienced no change in seed costs in 2016 relative to the previous year due to the static prices in the cereal markets. Given that cereal prices were reduced in 2016 relative to 2015, this price decrease has been transmitted to seed prices, with blue label seed costing around €460 per tonne for 2017, which is about 5 percent less than 2016 prices.

4.1.3 Crop protection – usage and price 2017

The increase in crop protection costs in 2017 relative to 2016 is forecast to be of a similar magnitude to the changes seen in each of the last three or four years. Whilst price changes have been minimal, at about 2 per cent on the price side, additional volume changes have been evident recently due to the increased number of sprays per season. Taking volume and price changes into account, based on recent data from the Teagasc, NFS,, a 3 per cent increase in crop protection expenditure is forecast for 2017.

4.1.4 Energy and Fuel – usage and price 2017

Fuel costs in 2017 will depend mainly on the evolution of crude oil prices. Current crude oil futures prices suggest that prices will increase from the 2016 average during the course of 2017 by about 20 per cent. Assuming that usage is unchanged, expenditure on fuel related charges are forecast to increase by about 10 per cent in 2017, given that full price transmission is not witnessed due to taxes and various other supply chain issues. Contractor charges are expected to remain similar to those experienced in 2016.

4.1.5 All other direct overhead costs 2017

All other direct and overhead costs are expected to increase by a very small amount, in line with recent price changes of such items, at about 3 to 4 percent depending on the cost item.

In terms of land rental prices for 2017, it is difficult to foresee how any upward movement in prices could be borne with prevailing cereal margins. As in previous years, anecdotal evidence is mixed regarding rental prices this early in the season. A forecast 5 percent increase has been assumed for 2017. This increase in land rental prices can be attributed mainly to competitive pressure from non-cereal uses, dairy farming in particular. Hence, for 2017 it is assumed that land rental prices will increase by 5 per cent.

4.2 The Outlook for Markets 2017

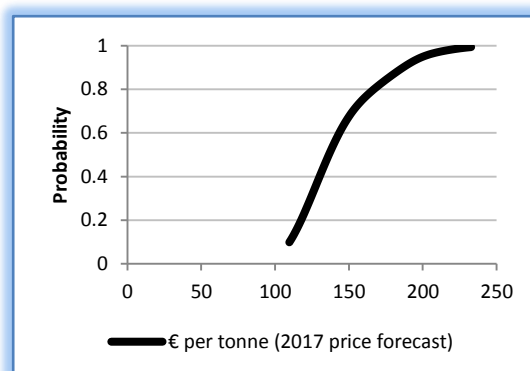
The cereals market has experienced significant volatility in recent years. Planting decisions by farmers will be influenced by expected farm gate cereal prices (and margins) in 2017. A number of

factors must be taken into consideration when making price forecasts for the coming harvest.

To formally evaluate the risk associated with predicting the 2017 harvest price an econometric analysis was conducted to predict the probability that the 2017 farm gate price will be higher or lower than the 2016 price. This analysis was based on the November 2016 LIFEE and MATIFF futures prices for November 2017 contracts. The regression analysis examined the historic relationship between (i) predicted futures price for the following harvest, made from the previous November/December when planting decisions were been made, and (ii) the actual farm gate price paid at harvest one year hence. This regression analysis enables a forecast to be made of the 2017 Irish farm gate cereal price for wheat, taking into consideration the differences between the historic predicted values and the actual outcomes.

Figure 14 outlines the probability of achieving various harvest prices in September 2017. Based on the econometric model developed, it shows that there is significant uncertainty concerning the predicted harvest price for September 2017. This predicted range is based on current futures trading prices (November 2016), and the spread around the mean value is based on how right or wrong futures markets have been in recent times in predicting prices one season ahead.

Figure 14: Probability Distribution of the predicted 2017 Wheat Harvest Price



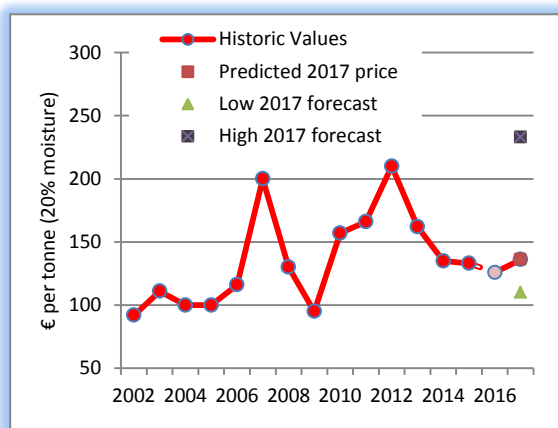
Source: Author's own estimates.

Based on the probabilities of achieving different harvest prices, the average predicted value from the model for the farm gate wheat price is approximately €136 per tonne at 20 percent moisture, which is about an 8 percent increase over harvest prices paid in 2016. However, there is significant variation surrounding this figure and

based on a 90 percent confidence interval, it is forecast that the figure could be as low as €110 per tonne or as high as €233 per tonne (Figure 15).

Various market reports have been examined to provide the rationale for the forecast increase in cereal prices for 2017. The latest edition of *Strategie Grains* (November 2016) forecasts stability in acreage for soft wheat and barley despite continued poor profitability in these crops in the EU. Soft wheat area is projected to remain static at 24.3 M ha and barley at 12.4 M ha. This stability in acreage is accredited to the exceptionally good weather conditions at sowing. However, there is some warning about falling temperature in northern and eastern Europe at the moment that could affect yields.

Figure 15: Historic, Estimated & Forecast Farm Gate Feed Wheat Price (2002 – 2017)



Source: Author's own estimates, 2017 forecast, at 90 percent confidence interval

The stability in cereal area (in the EU) is coupled with an assumption of achievement in trend yields in 2017 (seen Appendix A3 for further details on forecast changes in arable crop areas in the EU28 for 2017/18). An achievement of trend yields internationally, *ceteris paribus*, is assumed to have a positive impact on price given the bumper harvest achievement internationally in 2016. This assumption of course ignores a lot of other variables which potentially could have an impact on price, namely significant exchange rate movements and significant changes in demand from feed and food sources. It is still very early to forecast what might happen to these additional variables and futures markets tend to move closely in line with first production estimates and exchange rate predictions at this time of the year. Based on the futures market forecast and the adjustments made in the regression analysis for

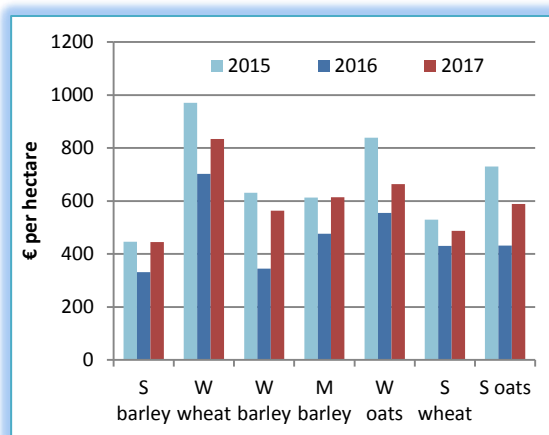
predicted versus actual outcomes, our forecast is that farm gate cereal prices will increase by a about 8 per cent in 2017.

4.3 The Outlook for Tillage Enterprise Margin in 2017

Direct costs are forecast to be slightly lower in 2017 relative to 2016, due to the forecast decrease in fertiliser expenditure and seed costs in 2017. Whilst all other direct costs of production (crop protection, machinery hire and other direct costs) are forecast to remain the same or increase slightly, overall direct costs should be lower than 2016 levels. Furthermore, output value on average is forecast to be slightly higher in 2017 for most crops due to yield and output price changes. The story on yields is slightly mixed, with some crops increasing in forecast yields and other decreasing when 5 year trend yields are assumed. However, the forecast slight increase in output price is expected to negate any negative effect of downward movement in yields. Figure 16 presents the actual gross margin for each of the main cereal crops in 2015, and the respective estimates and forecasts for 2016 and 2017.

The net effect of input price, output price and volume movements is forecast to have a slight positive effect on gross margins for 2017, with all major crops experiencing a slight increase in margin. For example, gross margins for winter wheat are forecast to increase by €130 per hectare, while gross margins for spring barley and winter barely are forecast to increase by approximately €110 and €220 per hectare respectively. The overall story for the 2017 forecast is for a moderate recovery in gross margins for all cereal crops if a reversion to trend yields is assumed. However, it must be noted that whilst a recovery in margins is forecast for 2017, the gross margins are still forecast to be below the 2015 level.

Figure 16: Actual 2015, Estimate 2016 and Forecast 2017 for Cereal Crop Gross Margins



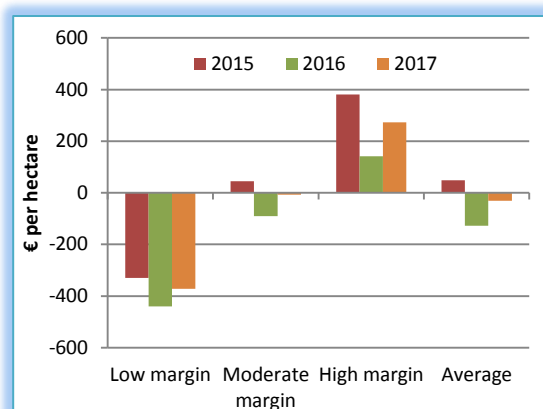
Source: Teagasc, National Farm Survey Data and Author's estimates for 2016 & forecast for 2017

Similar to the format used to present margins in 2015 and 2016 earlier in the paper, the forecast net margins for 2017, are presented for the cereal enterprise on specialist tillage farms, as well as the population of such farms disaggregated into one-third groupings based on margins obtained.

Figure 17 shows that the forecast net margins for the cereal enterprise in 2017 are higher than 2016 but lower than those recorded in 2015. The upward movement in margins is associated mainly with the increase in prices forecast for 2017.

Whilst direct costs overall are forecast to decrease in 2017, the story for overhead costs is less optimistic for 2017. Land rent and fuel are both major expenditure items and are both forecast to increase over 2016 price levels. Hence, the narrative for net margin diverges slightly from the gross margin story presented earlier for 2017. Some of the improvements in gross margin figures forecast for 2017 are eroded by fixed cost inflation. Nevertheless, the net result is for a slight improvement in net margins per hectare compared to 2016 for the average cereal enterprise in 2017, with average margins increasing by about €100 per hectare compared to 2016. However, this still leaves net margins in negative territory and less than the net margins achieved in 2015.

Figure 17: Net Margin Actual 2015, Estimate 2016 and Forecast 2017 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2016 & forecast for 2017

5. Concluding Comments

The 2015/2016 production year saw downward movement in cereal gross and net margins for the main cereal crops. With only a slight decline in direct costs of production on cereal farms estimated for 2016, this was not sufficient to counter balance the decline in yields and prices observed for all major crops in 2016. Spring barley gross margins decreased by approx. €100 per hectare, while Winter wheat and Winter barley decreased by approximately €250 per hectare. The highest recorded gross margin of all tillage crops in 2015 was winter wheat.

The forecast for net margins on tillage farms in 2017 is for some recovery over margins estimated for 2016, with the forecast 8 per cent increase in cereal prices in 2017, a return to trend yields and a slight decrease in direct costs. The overall picture for cereal crops is that in general margins will remain very tight in 2017, with any upward movement in margins forecast for 2017 not sufficient to return to margins witnessed in 2015.

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[df](http://www.fertilizer.org/imis20/images/Library_Downloads/2016_IFa_Moscow_Summary.pdf)

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Strategie Grains (2016) November 2016 Bulletin.

Table A1: Production Costs, Output and Gross Margin for Major Cereal Crops in 2015 (€/ha)

	S. Barley	W. Wheat	W. Barley	M. Barley	W. Oats
Gross Output	1,119	1,821	1,471	1,344	1,538
Fertiliser	244	334	325	296	281
Seeds	87	89	89	94	87
Crop Protection	163	270	245	165	223
Hired Machinery	158	152	176	175	100
Other Direct Costs	20	5	5	2	7
Total Direct Costs	673	851	840	733	698
Gross Margin	446	971	631	611	839

Source: 2015 National Farm Survey Data

Table A2: Variation in output and margin 2015: top and bottom performing cereal farms*

	Spring Barley		Winter Wheat	
	Bottom	Top	Bottom	Top
Yield (tonnes per hectare)	6.8	7.9	10.8	11.9
Price per tonne	144	147	156	158
Gross output (€ per hectare)	1,031	1,260	1,750	1,980
Fert., seed, spray (€ per hectare)	560	487	705	678
Machinery hire (€ per hectare)	168	61	64	58
Other direct costs (€ per hectare)	45	7	8	6
Gross Margin (€ per hectare)	258	705	778	742
Allocated Fixed Costs (€ per hectare)	526	473	799	604
Total Costs (€ per hectare)	1,299	1,028	1,577	1,346
Net Margin (€ per hectare)	-268	232	174	634

Source: 2015 National Farm Survey Data

*Excluding farms with less than 10 hectares

Table A3: Changes in arable crop areas in the EU28

	Areas (000 ha)			
	2013/14	2014/15	2015/16	2016/17
Total Cereals	57,270	57,750	57,130	57,190
Total Oilseeds	12,140	11,950	11,890	11,930
Total Protein Crops	1,200	1,350	1,640	1,650
Silage	6,000	6,080	6,160	6,090
Set-aside & Fallow Land	5,276	4,910	5,361	5,151
Sugar beet	1,600	1,630	1,480	1,570
Total area cultivated and set-aside	83,496	83,700	83,661	83,581













Source: Strategie Grains (November 2016)

Irish Pig Sector in 2015













 Sow population 149 thousand head down 0.8 % on the 2014 level		 Live Pig Exports 0.514 million head down 1% on the 2014 level	
 Pig Slaughter 3.13 million head up 6.5% on the 2014 level		 Feed Prices €303 per tonne down 6% on the 2014 level	
 Pig prices 148 cent per 100 kg down 11%		 Margin over feed cost 37 cent per kg down 25% on the 2014 level	

Source: Teagasc Pig Development Unit, Central Statistics Office and Department of Agriculture, Environment and Rural Affairs Northern Ireland

Irish Pig Sector in 2016

 Sow Population 146 thousand head down 2.6 % on the 2015 level	
 Pig Slaughter 3.219 million head up 2.8% on the 2015 level	
 Live Pig Exports 0.408 million down 20% on the 2015 level	
 Pig prices 149 cent per kg up 1% on the 2015 level	
 Feed Prices €291 per tonne down 4% on the 2015 level	
 Margin over Feed Costs 43 cent per kg up 14% on the 2015 level	

Irish Pig Sector in 2017

 Sow Population 146 thousand head unchanged on the 2016 level	
 Pig Slaughter up 3.28 million head up 2% on the 2016 level	
 Live Pig Exports 0.368 million down 10% on the 2016 level	
 Pig Prices 147 cent per kg down 2% on the 2016 level	
 Feed Prices €285-295 per tonne little change on the 2016 level	
 Margin over Feed Costs 42 cent per kg down 2% on the 2016 level	

Source: Teagasc Pig Development Unit Estimates for 2016 and Forecasts for 2017

Review of Pig Sector in 2016 and Outlook for 2017

Michael McKeon

Pig Development Department, Teagasc

1. Introduction

In recent years (2012-2015) the low profitability in the pig sector has been attributable to high feed ingredient prices. While feed prices were stable in 2016, the pig price suffered large fluctuations.

The Irish pigmeat price was high in early 2015, despite the closure of the Russian market, due to a disease outbreak in the U.S. The disease (PEDv) was contained in the latter half of 2015, which led to renewed growth in global pigmeat stocks and a consequential slump in the European pig price. This slump continued until mid-2016 creating very difficult cashflow conditions for producers.

During 2016, the low pig price relative to pig feed prices, resulted in a very poor 'Margin over Feed' in the first half of the year. This reached a 20 year low in March. Since then there has been a steady recovery and the overall 2016 margin-over-feed is estimated to be 43c/kg, which equals the 5 year average.

2. Irish Pig Production Costs 2016

The cost of producing pigmeat in Ireland can be broken into feed cost and non-feed costs. Feed currently constitutes 68 per cent of the total cost of producing a pig, with the non-feed inputs contributing the remaining 32 per cent. The primary source of volatility from 2012-2015 had been feed cost, but since then the volatile pig price has been the main influence on profitability.

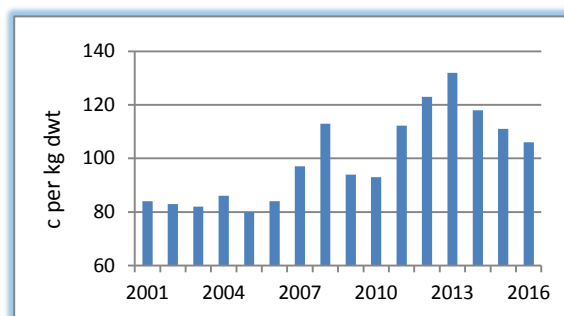
2.1 Irish Pig Feed Costs 2016

Feed prices were stable in 2016 after a number of turbulent years. The large global harvests in 2014-2016 ensured that world stocks were high and therefore prices remained stable. The 2016 composite feed price per tonne is estimated to be €291, a drop of 4% in composite feed cost per tonne when compared to 2015.

When the composite feed price is examined over a longer period the 2016 price of €291 is lower than the 5 year average (2012-2016) of €320 but lower than the 10 year average (2007-2016) of €295.

Annual Irish composite pig feed prices are shown in Figure 1, expressed in terms of the cost per kg deadweight (dwt).

Figure 1: Irish pig feed cost 2001-2016



Source: Teagasc Pig Department

The composite compound feed price remained extremely stable throughout the year. Monthly pig feed prices for 2016 are shown in Table 1.

Table 1: Purchased Irish Compound Feed Prices in 2016

Month	Composite Feed Price € per Ton	Feed Cost cent per kg dwt
January	299	109
February	298	109
March	298	109
April	298	109
May	289	105
June	289	105
July	289	105
August	289	105
September	289	105
October	288	104
November*	285	103
December*	283	102
Average	291	106

Source: Teagasc Pig Department * Estimate / Forecast

The annualised feed cost per kg dead weight of 106 cent is significantly lower than previous years (132c/kg, 2012) and generated a modest annual profit margin. This would have been significantly

greater had the pig price not slumped in the first quarter of 2016.

2.2 Non-feed costs in Irish Pig Production in 2016

The variable and fixed costs can be separated into *Non-feed Costs* and *Financial Costs*. The data quoted for the Irish industry is collected from herds using the Teagasc ePM herd recording system which records, analyses and benchmarks herd productivity and financial performance. There are currently 96,000 sows on the database from a national herd of about 146,000 (67% of total). The costs quoted are based on the national 2015 ePM data, which are the most recent analysis of annualised costs available. Non-feed costs are itemised in Table 2.

Table 2: Non-Feed Costs in ePM Recorded Herds

Cost Item	2015	2011-2015
	cent per kg dwt.	
Healthcare	6.2	6.3
Heat, Power Light	4.2	4.2
Transport	1.2	1.2
AI	1.8	1.6
Manure	1.5	1.6
Labour/Management	13.3	12.6
Repairs	2.2	1.9
Phone/Office	1	0.6
Environment	0.4	0.5
Insurance	0.9	0.7
House rental	1.3	1.1
Contract Costs	1.5	1.4
Water	0.4	0.4
Dead Pigs Disposal	0.7	0.6
Stock Depreciation	1.8	1.1
Miscellaneous	1.2	1.4
Total	39.6	35.0

Source: Teagasc ePM Report 2015

The non-feed costs in 2015 were four cent per kg dwt higher when compared to the previous five year average, but ten cent higher than the 2012 price of 29.8 cent per kg dwt. The single largest increase in 2015 costs when compared to 2013 was an increase in labour costs which rose by one cent per kg dwt.

2.3 Financial Costs in Irish Pig Production in 2015

These costs include interest payments and building depreciation and vary greatly from unit to unit

depending on the age of the unit and the level of capital investment undertaken in the business in recent years. Financial costs are itemised in Table 3.

We estimate that the cost of building depreciation and interest is significantly lower than the true level required for a healthy pig industry. This reflects the sector's reduced capital investment in recent years due to the low profitability of the industry.

Table 3: Financial Costs in ePM recorded herds

Cost Item	2015	2011-2015
	cent per kg dwt.	
Interest	1.4	1.9
Building Depreciation	4.4	3.6
Total	5.8	5.5

Source: Teagasc Pigsys Report 2015

2.4 Total Cost of Irish Pig Production in 2016

The estimated annualised cost of production in 2016 (based on 2015 non-feed costs and 2016 feed costs) was 151 cent per kilogram dwt for pigs delivered to the slaughter plant. This production cost remained very stable throughout the year reflecting the stable feed price.

3. Irish Pig Prices in 2016

The estimated average pig price in 2016 was 149 cent per kg dwt, which was significantly below the previous five year average (2012-2016) of 161 cent per kg dwt.

The annualised 2016 pig price was a cent higher than 2015, but this average hides large fluctuations. The lowest monthly price was 134c/kg (March) and the highest was 164c/kg (September), a 22 percent increase within 6 months.

The outbreak of PEDv disease in the US in 2014 reduced U.S pigmeat exports. This temporarily helped the E.U. exporters to off-set the loss of the important Russian export market. However by mid-2015 the Irish pig price began to drop due to the U.S. industry recovering and an oversupply of EU pigmeat production.

This decline continued for the next 12 months, until June 2016, with the Irish price falling to its lowest ebb of 134c/kg in March.

Table 4: Monthly Irish Pig Price in 2016

Month	Pig Price
	Cent per kg dwt
January	138
February	138
March	134
April	136
May	141
June	149
July	154
August	156
September	160
October	163
November*	160
December*	160
Average	149

Source: Teagasc Pig Department

* Estimate / Forecast

Fortunately for European producers, the Chinese sow herd contracted dramatically in 2015 and 2016, with an estimated 12 million sows being culled, which is equivalent to the total EU herd. This resulted in the domestic Chinese pig price escalating to the equivalent of \$300/head and triggered a surge of imports into China. The pig price recovered across Europe in the latter half of 2016 to generate an annualised price similar to 2015.

Table 5: European Pig Prices January to October 2015 and 2016

	2015	2016	
Country	Jan – Oct	Jan – Oct	Change
	Euro per kg	Euro per kg	%
PAYS-BAS VION	1.37	1.44	5.7
DK 61%	1.24	1.29	3.6
DE ZMP 56%	1.41	1.48	4.4
ES Llerida vif	1.16	1.13	-2.5
IT vif Modena	1.30	1.34	3.4
FR MPB 56%	1.26	1.29	2.7

Source: MPB 2016

4. Profitability of Irish Pig Production in 2016

The margin over feed costs per kg dwt in 2015 was 37 c/kg, the lowest since 1999. The margin in 2016 increased to a healthier 43 c/kg.

Table 6: Average Margin over Feed Costs from Compound Feed from 2008-2016

Year	Pig Price (Net)	Feed Cost	Margin over Feed
	Cent per kg dwt		
2008	152	113	39
2009	145	94	51
2010	140	93	47
2011	151	112	39
2012	166	123	43
2013	176	132	44
2014	167	118	49
2015	148	111	37
2016*	149	106	43

Source: Teagasc Pig Development Department *Estimate

When the 2016 margin over feed (MOF) is compared to the average margin over feed of the last five, ten, fifteen, and twenty years (see Table 7) the difficult trading conditions and low profitability of recent years becomes clear.

If an average MOF of 50 cent per kg (estimated by the author as a requirement to meet all production costs including financial repayments) is added to the feed costs incurred during 2016, then the margin over feed at 43 c/kg, while better than 2015 (37c/kg), is still critically short of this target. The low margin in the previous five years (43 cent per kg dwt) now requires a substantially higher margin over feed than 50 cent in order to reduce the accumulated feed credit debt and poor building maintenance that now exists in the sector.

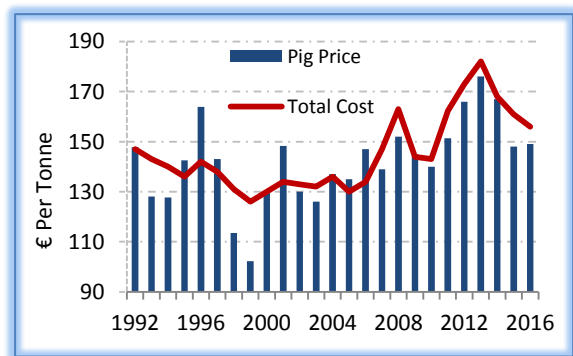
Table 7: Margin Over Feed in 2016 compared to the 5, 10, 15, and 20 year average

	Margin Over Feed	% Diff.
	cent per kg/dwt	
2016*	43	-
5 Yr average	43.2	+0.7
10 Yr average	43.4	+1
15 Yr average	46.3	+7.2
20 Yr average	46.1	+6.7

Source: Teagasc Pig Development Department *estimate

Figure 2 illustrates the pig price received when compared to the total production cost (feed plus 50 cent) since 1992.

Figure 2: Pig Price compared to estimated Total Production Cost



Source: Teagasc Pig Development Department
2016 is an estimated value

5. Irish Pig and Sow numbers in 2016

The latest sow survey of commercial pig production units revealed a slight decline in sow numbers when compared to the previous survey. Irish sow numbers are shown in Table 8.

Table 8: Sow Numbers in Commercial Pig Herds 2010-2016

Year	Sow Numbers
	000 head
2010	161.4
2011	156.2
2012	145.7
2013	147.5
2014	151.1
2015	149.9
2016	146.0*

Source: Teagasc Pig Development Department *estimate

The sow herd census indicates that the Irish sow population continues to remain remarkably robust at about 146,000 sows, despite low profitability.

Table 9: Irish born pigs slaughtered: 2012 to 2016

Year	2013	2014	2015	2016
	million head			
Slaughter Pigs	3.4	3.5	3.65	3.63*

Source: Teagasc Pig Department *estimate

The number of Irish pig disposals in 2016 is estimated to be 3.63 million pigs, which is

marginally lower than 2015, but still at a high plateau. This is a reflection of the increased number of pigs born alive in the national herd and improved national herd health.

Table 10: Slaughter and Live Export to N. Ireland of Irish Born Pigs from 2006 to 2016

Year	Licensed Export Plants in Ireland	Exports to Northern Ireland	Exports as % of Total
	million head		%
2006	2.619	0.478	15%
2007	2.570	0.512	17%
2008	2.511	0.457	15%
2009	2.363	0.482	17%
2010	2.601	0.558	18%
2011	2.847	0.610	18%
2012	2.907	0.612	17%
2013	2.829	0.570	20%
2014	2.940	0.519	18%
2015	3.132	0.514	16%
2016*	3.219	0.408	13%

Source: DAFM & DARDNI *estimate

The export of Irish born pigs to Northern Ireland (NI) is estimated to have fallen by over 100,000 head during 2016, which continues the downward trend in recent years. Since 2012 the annual number of pigs exported to NI has decreased by an estimated 200,000 pigs.

The trend of lower Irish slaughter pig disposals in 2016 was also reflected in Germany, Denmark and the Netherlands, as illustrated in Table 11.

Table 11: European & N. American Pig Disposals

	2015*	2016*	Change
Country	Million head		%
Germany	41.6	41.1	-1.3%
Spain	30.1	31.7	5.5%
France	15.5	15.7	1%
Denmark	14.8	14.3	-3.5%
Netherlands	12.3	12.1	-1.1%
UK	7.8	8.1	3.2%
Total	122.1	123	0.7%
U.S.	92.4	93.6	1.3%
Canada	15.8	15.9	1%

*Based on 42 weeks of production
Source: MPB 2016

Over the first 42 weeks of 2016 the combined pig slaughtering of the major European producing countries increased by an estimated 0.7% when compared to 2015. Spain had the single biggest increase with 1.5 million extra pigs slaughtered in 2016. Spanish output has now increased by 3.5 million pigs over the last two years and is now the fastest growing herd in Europe. In 2016 US slaughterings also rebounded (+1.3%) relative to 2015, in the aftermath of its PEDv disease outbreak in 2014.

6. EU Pigmeat Exports & Imports in 2016

The export of pigmeat products from the EU increased in 2016 (Jan-Aug) by a record 33 per cent as shown in Table 12. This is based on the increase in exports to China and results in the EU now being very heavily dependent on this export market.

Table 12: Pigmeat exports from selected countries

Country	2015	2016*	change
	million tonnes		%
EU	2.07	2.75	33
USA	1.41	1.48	5
Canada	0.75	0.81	8
Brazil	0.33	0.47	42
Total	4.56	5.51	+17

Source: MDP

* Jan-Aug 16

7. Outlook for the Irish Pig Market in 2017

The outlook for the pig market is usually a reflection of global pig feed and pig price trends as these are the key factors affecting profitability. However added to the mix now is the effect of Brexit negotiations during 2017 and 2018. While the trade effects of this are currently unknown, it is unlikely to be a favourable development to the Irish pig market.

7.1 Irish Pig Feed Price Outlook in 2017

Pig feed is the single largest input cost. Therefore the trend in the price of this input will have a substantial effect on the profitability of the sector in 2017. The feed price outlook is dependent on wheat, maize and soyabeans, as these are the principal pig feed cost drivers.

The estimated composite compound pig feed price in December 2016 is €283 per tonne. The bumper global harvests in 2015 and 2016 have resulted in very healthy stock to end use percentages for

wheat (33.7%), maize (21.3%) and soyabean (23.5%) – USDA October 2016. These copious stocks should ensure stable prices until mid-2017, where upon the progress of the autumn harvest 2017 will dictate prices for the latter half of 2017.

The South American soyabean harvest is currently being planted with Brazilian production quantities of 102 million tonnes forecast, which would generate the largest Brazilian harvest ever. While this should dictate low soyabean prices in 2017, it is expected to be offset by higher Chinese imports of 86 million tonnes. The outlook for soyabean prices therefore is for little change, provided normal weather conditions prevail.

The current feed ingredients futures market prices indicate very little change over the 2016 annual composite pig feed price. This would indicate that the composite compound pig feed price will continue in the range of €285 to €295 for 2017.

7.1.1 Irish Pig Prices in 2017

The Irish pig price was weak in early 2016 with a sharp increase in the third quarter. The return to stability of the EU sow herd in 2017 and increased numbers of piglets born alive, will increase the supply of European pigs. It is estimated this may be in the region of 2.0 to 2.5 per cent. This increased EU volume on the market, with record increases in US slaughter volumes, will provide quite a degree of export competition, especially in Q3 and Q4 of 2017.

Irish and European pig prices will be significantly influenced by the level of Chinese pigmeat imports in 2017. The Chinese pig herd has stabilised and has been experiencing high profit levels for the last 12 months. This should have stimulated a large recovery of the domestic sow herd, but this appears to be slower than originally expected. Local government appear to be anxious to ensure that only pig units that meet environmental standards will be licensed to re-open.

In the interim the shortfall will continue to be filled by European and American exports which will further reduce the volume of pigmeat overhanging the European market. However, in the latter part of 2017 it is expected that the level of exports may weaken, thereby reducing the Irish pig price. Overall, a 2 per cent decrease in the pig price is forecast for 2017.

7.1.2 Profit Margin in 2017

If the current composite feed price remains largely unchanged until the latter half of 2017 and the pig price also remains steady for much of 2017 (due to continued strong Chinese imports in Q1 and Q2), then there will continue to a profitable margin for Irish pig producers in 2017. The industry requires a period of prolonged profitability in order to reduce current high levels of feed credit and undertake required repairs and capital investment.

The outlook for 2017 is for profitability in the pig industry to continue to remain challenging, with a positive outlook heavily dependent on the export market or a disease outbreak in Europe.

8. Conclusion

In 2016 the Irish pig industry experienced moderate feed prices, but considerable fluctuations in pig prices. This returned a margin-over-feed of 43 cent per kg dwt. While this is higher than 2015 (37c/kg), it is below the minimum required margin-over-feed of 50 cent. The estimated composite pig feed cost of €283 per tonne in December 2016 is expected to be maintained until July 2017, with the possibility of a moderate increase in the latter half of 2017.

It is expected that the market conditions in 2017 will return a steady pig price for the first half of 2017, primarily due to continued strong Chinese import demand, but this may weaken in the latter half of 2017, with a resultant moderate reduction in Irish pig prices.

Situation and Outlook for Forestry 2017

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1. Introduction

Government confidence in and commitment to the overall forestry programme are reflected in the 2016 and 2017 funding allocations of €113.8 million & €111.6 million respectively. This funding allocation is the most capital intensive element of the overall Department of Agriculture, Food and the Marine programme.

The National Strategic Plan for Forestry has a target to expand forestry to 18% of the land area by 2046 (DAFM, 2014), with most new planting taking place on farmer-owned land. Afforestation and other grant schemes continue to play an important role in the promotion of farm forestry and in the encouragement of increased productivity in conifers and quality broadleaf forests.

Forest Service figures showed that in 2012, direct output in the forestry sector (excluding the processing sector) was €378 million. For every one million euro in expenditure in this sector a further €0.78m in expenditure was generated in the rest of the economy, hence the overall contribution of forestry to the Irish economy was €688 million (Forest Service, 2015a).

Direct output in the wood products sectors (i.e. panel board mills, sawmills and other wood products sector) was €1.389 billion in 2012. The total value (direct and indirect) to the economy of these wood processing sectors was €2.2 billion. The most recent aggregate employment figure for the forest sector as a whole is estimated at close to 12,000 persons, the majority of whom are employed in rural Ireland. (Ní Dhubháin *et al*, 2012).

Food Wise 2025 has set out a strong growth agenda for both the timber processing and wood energy sectors and high production targets for wood biomass have been set by the European Renewable Energy Directive (2009/28/EC). After wind energy, wood fuels are the largest contributor to renewable energy generation in Ireland, while the contribution of forests to climate

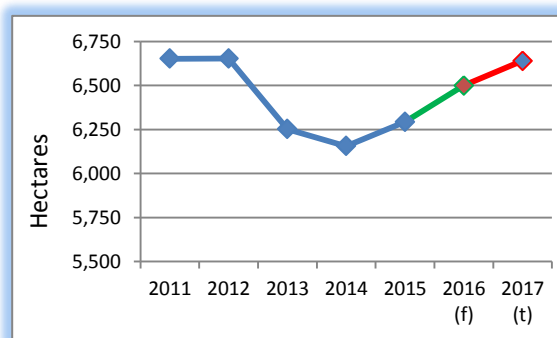
change mitigation through carbon sequestration and the use of wood products form an important element of the national climate change strategy (DAFM, 2015a).

2. Planting in 2016

2.1 Planting levels

To date, the total forest area in Ireland is over 750,000 hectares (ha), representing approximately 11% of the total land area. Privately owned forests account for 47% of this total (Phillips *et al*, 2016). Almost 85% of private forest owners are classified as farmers (Forest Service, 2015a). The annual planting area has stabilised at under 7,000 ha in recent years, with 6,252 ha and 6,156 ha planted in 2013 and 2014 respectively (Forest Service, various years). Figure 1 shows an increase in the level of afforestation to 6,293 ha in 2015, following the launch of the new Forestry Programme 2014-2020.

Figure 1: Annual planting 2011 to 2015, with 2016 forecast (f) & 2017 target (t)



Source: Forest Service, various years

The programme planting target for 2016 provided for 6,300 hectares of new planting under the Afforestation, Native Woodland Establishment and Agro- Forestry schemes, along with limited funding for support schemes (Forest Service, 2015b). By September 2016, 5,250 ha were planted (Forest Service, 2016) and the end of year figure is expected to be 6,500 ha, exceeding the programme planting target for 2016 by 4% approximately. The planting target for 2017 is set at 6,640 ha (Forest Service, 2015b).

2.2 Deciding to plant

A number of factors are believed to have contributed to the relatively modest increase in planting level in 2016. Farmers' attitudes towards forestry are strongly linked with land quality and possible alternative land uses (Ryan *et al.*, 2013). In addition, on-going restrictions due to environmental considerations have affected the availability of land suitable for planting (COFORD Land Availability Working Group, 2016).

Each year, the Teagasc National Farm Survey (NFS) collects information on a sample of farms with a forest enterprise. The sample is statistically weighted to represent the national farming population. Of the 79,103 farms covered by the survey in 2012 (Hennessy *et al.*, 2013), 6,966 farms (9%) have forests, representing an average ownership of 10.5 ha per forest owner. An analysis of the farm system of farms with forests in the survey is shown in Table 1.

Table 1: Percentage of farms with forests by farm system in 2012

Farm system	% of farms with forest by farm system
Dairying	16
Mixed livestock	4
Cattle rearing	30
Cattle other	26
Sheep	11
Tillage	13

Source: Ryan *et al.* (2013)

Analysis shows that the largest percentage (56%) of farms with forests is in the cattle rearing and cattle other systems. Teagasc NFS data suggest that farmers involved in cattle and mixed livestock systems are more likely than those involved in dairy and tillage to enter forestry (Howley *et al.*, 2012). This is likely to be a reflection of the higher relative returns from these agricultural systems.

Employing net present values and discounting to account for differences in rotation lengths and income streams, allows for indicative comparisons between forestry with more conventional land uses. However, these comparisons do not take into account the irreversibility of the planting option and the opportunity cost associated with permanent land use change. Research suggests that for the majority of farmers, maximising profit is just one of a range of factors affecting the decision to plant (Ryan *et al.*, 2013). The lack of

labour input, long production cycles, the fundamental change away from food production and the irreversibility of forestry may be perceived as either positives or negatives. It is important to note that there is a high level of satisfaction amongst farmers that have planted. A national campaign of afforestation promotion, supported by forestry sector stakeholders, will run from 2017 to 2020, to promote afforestation.

3. Timber markets in 2015/ 2016

3.1 Domestic market

The overall net demand for roundwood/ wood fibre on the island of Ireland is forecast to increase from 4.6 million cubic metres (m³) in 2014 to 6.41 million m³ by 2020, an annualised rate of increase of 6% (Phillips, 2011). Boardmill demand (including the use of sawmill residues) is forecast to increase from 1.40 million m³ in 2014 to 1.60 million m³ by 2020, an increase of approximately 2.5% per year (COFORD Wood Mobilisation Group, 2015).

Sawmilling demand is forecast to rise at a faster rate, from 2.67 million m³ in 2014 to 3.28 million m³ by 2020, an increase of 0.6 million m³, a 3.5% year-on-year increase (COFORD Wood Mobilisation Group, 2015). The rates of growth in demand for raw material are directly linked to the expected growth in product demand. The higher rate of projected demand for the sawmilling sector matches the "Recovery" scenario prediction of GDP growth of 4% over the period 2015-2020, outlined in the ESRI medium term economic outlook (Fitzgerald and Kearney, 2013).

During 2015, consumption of sawn timber in Ireland grew by 9.9%, driven by an on-going improvement in construction markets (CIF, 2016). In 2015, 51% of the Irish market for sawn softwood timber was supplied by domestic production with the balance being imported (Knaggs & O'Driscoll, 2016). The domestic market accounted for 20% of the total sawn- timber production and 14% of wood- based panel board in 2015 (IFFPA, 2015).

The demand for higher value construction timber has risen in recent years, with the number of completed houses growing by 15% over the period 2014- 2015. It is forecast that 14,000 units will be completed in 2016, an increase of 18% on the previous year (CIF, 2016). The continuing increase in the demand for timber for construction in Ireland is illustrated in Table 2.

Table 2: Actual & forecast house completions in Ireland from 2013 to 2016

Year	House completions
2013	8,301
2014	11,016
2015	12,666
2016f	14,000

Source: CIF, 2016

Approximately 34% of the roundwood used in the Republic of Ireland in 2015 was used for energy generation, mainly within the forest products sector. The use of wood biomass energy in Ireland results in greenhouse gas (GHG) emission savings from the displacement of fossil fuels. The saving in 2015 was estimated at over 0.6 million tonnes of carbon dioxide (CO₂) (O'Driscoll & Hendrick, 2016).

237,000 m³ of firewood, valued of €34 million, was consumed in the Republic of Ireland in 2015 (O'Driscoll & Hendrick, 2016), providing a steady and a growing market for first thinnings. The 2015 estimates (see Table 3) represent a 61% increase in firewood consumption since the 2006 figure recorded by Central Statistics Office's (CSO) Household Budget Survey (COFORD, 2011).

Table 3: Volume and Value of Domestic Firewood Market in Ireland

Year	2011	2012	2013	2014	2015
'000 m ³	214	225	230	235	237
€ mill	31.0	32.6	33.3	34.0	34.3

Source: UNECE report, 2016. Drima Market Research study.

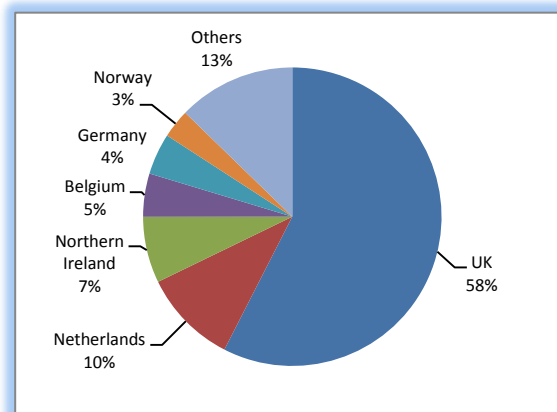
3.2 Export market

Exports of forest products from Ireland were €355 million in 2015. In this period, 769,000 m³ of wood-based panels (WBP) were produced from an intake of 1.37 million m³ of wood. A very high proportion (79%) of WBP manufacture was exported (610,000 m³) to a value of €190 million (Knaggs & O'Driscoll, 2016). WBP exports mainly comprised oriented strand board (OSB) and medium density fibreboard (MDF). Key export markets are the UK and the Benelux countries, (see Figure 2). In addition, paper products valued at €44 million were exported in 2015.

Timber sales to the United Kingdom (UK) are by far the largest Irish export market. In 2015, 6.3 million m³ of sawnwood, valued at £1.31 billion, was

imported into the UK, a fall of 2% from the 2014 figure, (Forestry Commission, 2015 & 2016).

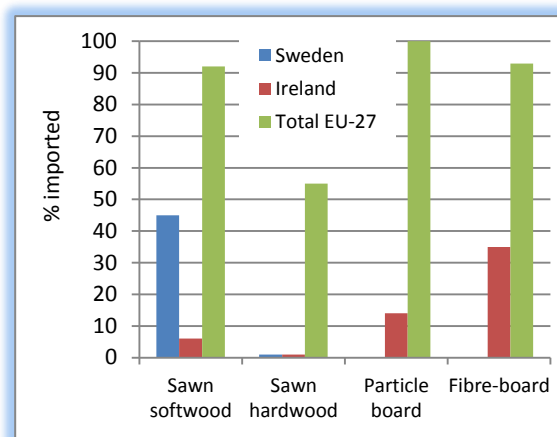
Figure 2: Key export markets (%) for panel products manufactured in Ireland (2011-2015)



Source: EUROSTAT 2016 & Drima Market Research

The most recent figures in 2015 show that Sweden (45%), Latvia (16%) and Finland (14%) provided the majority of imports of sawn softwood to the UK, while Ireland supplied 6% of that market (see Figure 3), valued at approximately €121 million (Knaggs & O'Driscoll, 2016).

Figure 3: Country of origin of wood imports (%) to the UK, 2015



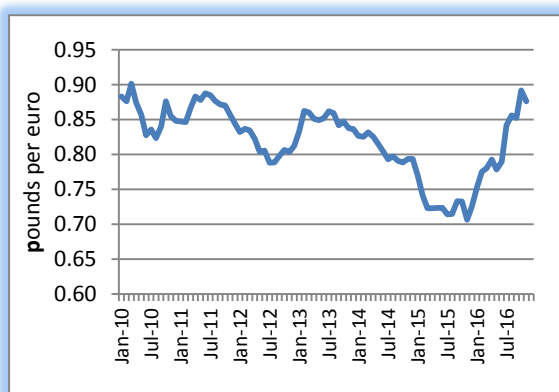
Source: Forestry Commission 2015 & 2016

Concurrently, 3.3 million m³ of wood-based panel products, incl. particleboard & fibreboard, valued at £0.96 billion were imported to the UK, a 1% decrease from 2014 figures. All particleboard imports to the UK in 2015 came from within the EU (mainly Germany (23%), France (21%) and Ireland (14%)). This is comparable to the figures in 2014, when Ireland supplied 13% and France supplied 24% of the particleboard market. The EU also supplied the majority of fibreboard imports to the UK market, with Ireland retaining its leading

supplier role at 35%, followed by Germany (21%) and Spain (11%) in 2015 (Forestry Commission, 2016).

The UK market continues to be very competitive and relatively high log prices in Ireland mean tight profit margins for Irish mills supplying the UK market. Fluctuations in the exchange rate between sterling (£) and the Euro (€) as illustrated in Figure 4, can result in almost immediate effects on the export of timber to the UK.

Figure 4: Monthly Sterling/ Euro exchange rate 2010 -2016



Source: European Central Bank, 2016

The UK is the main market outlet for almost all our exported sawn products and a high proportion of Ireland's panel board products. Exports of wood products reached €370 million in 2015, including €190 million of wood panels and €121 of sawn timber (IFFPA, 2015). Should Sterling remain weak, the favourable gap that has existed between log prices in the UK and Ireland is likely to close further. Given that Irish timber processors are heavily reliant on exports to the UK, the implications of Brexit for the Irish forest and forest products industry are potentially strongly negative.

These implications include vulnerability to currency fluctuations, possible future trade tariffs and an increased competitive advantage to EU member states such as Finland and Sweden, who produce slower growing structural timber, with higher strength qualities and end use range. A slowdown in the British economy and a consequential reduction in timber demand, is also a possibility. However, from a positive viewpoint, Ireland is well positioned geographically to capitalise on existing and future markets in the UK, which imported 62% of its sawn softwood requirements in 2014 (Forestry Commission, 2015).

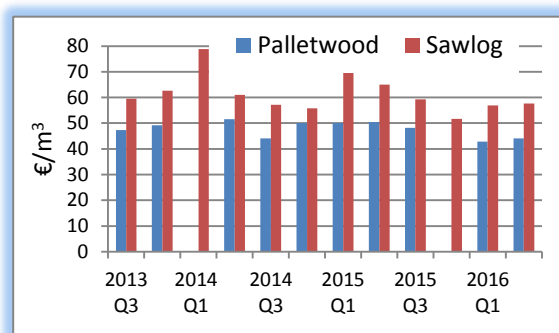
4. Timber prices

4.1 Coillte Timber prices

Timber prices vary with demand and supply each year as is illustrated using Coillte standing timber prices. Coillte is the dominant supplier of logs to the processing sector which it sells through its timber sales electronic auctioning system. The standing timber price is that price paid to the forest owner by the buyer for the timber standing in the forest. The buyer then incurs the costs of harvesting and extraction.

Figure 5 shows quarterly Coillte contracted standing sales (€/m³) for selected average size categories between June 2013 and June 2016. Timber prices are recorded in terms of 16 categories of average tree size (volume). For simplicity of analysis, palletwood and sawlog timber assortments are represented by the 0.225 to 0.274 m³ and 0.500 to 0.599 m³ average size categories respectively. Sales of smaller logs (pulpwood and energy wood) are not represented in Coillte data.

Figure 5: Coillte quarterly contracted standing sales: June 2013 to June 2016



Source: www.itga.ie

The trend towards a general reduction in log prices following Storm Darwin in February 2014, notably in larger log sizes, was mainly due to increased timber supply as clearing of storm damaged forests progressed. Prices of sawlog rebounded in early 2015 but dropped steadily over the course of the year. While Irish timber exports remained competitive during 2015, factors such as the 5% increase Scandinavian exports of sawn & planed timber to the UK moderated the favourable exchange rate conditions for Irish timber exporters (Forestry Commission, 2016). Harvesting of storm damaged forests also continued and has led to increased timber supply levels which contributed to price fluctuations.

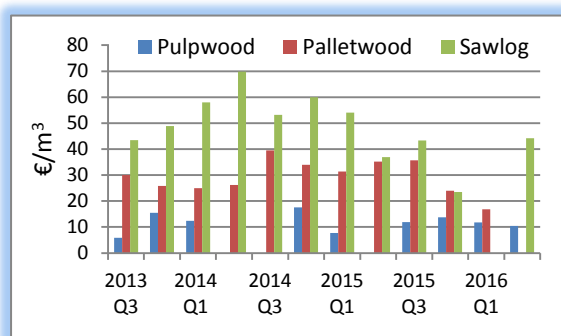
Sawlog prices have remained buoyant in the first half of 2016. Palletwood prices have also shown buoyancy over the analysis period with a slight increase up to June 2016. Contact with buyers suggests price slippage in the third quarter with a weakening Sterling and Brexit uncertainty being cited as influences.

4.2 Private timber prices

Prices from private timber sales are available for each quarter through the Wood Price Quarterly (WPQ) collated by University College Dublin in conjunction with the Irish Timber Growers Association (ITGA). While the availability of private timber sale data has improved with the introduction of the WPQ, the larger volume of Coillte sales makes them more robust than current private sales data. Coillte prices however are representative of larger sale lots than the private sector.

Figure 6 shows quarterly private standing prices (€/m³) for selected average size categories between June 2013 and June 2016. While this price data is based on a much smaller sample, it includes some pulpwood prices (represented here by average tree size category up to 0.074 m³) from the private sector which are absent from the Coillte price date.

Figure 6: Private quarterly roundwood prices: June 2013 to June 2016



Source: www.itga.ie

The overall trend for private sales is also one of reduced prices between June 2014 and June 2015 for medium to large log categories (Figure 4) post Storm Darwin 2014. While trends for small diameter timber are difficult to evaluate due to gaps in reported data, prices have tended to be cyclical reflecting supply/demand scenarios. The influence of sterling fluctuations is not as strong for small sized logs especially in markets such as firewood and energywood. There was an upward price trend for this category in 2015 with prices

lowering somewhat during 2016 due to increased supply.

Ongoing private forest prices reported to the Teagasc Forestry Development Department (FDD) are indicative and can vary widely according to factors such as region, forest type, harvest type, timber quality and access in the prices offered for private timber sales. The overall range of prices is outlined in Table 4.

Table 4: Reported private timber sale prices €/m³, as of Oct. 2016

Product	Length	Diameter	Standing /m3
	m	cm	€
Firewood	3.1(varied)	varied	6- 12
Energywood	2-3	5 to 14	3- 8
Pulpwood	3	7 to 14	3- 8
Stakewood	1.6	7 to 14	12- 16
Palletwood	2.5 -3.7	14+	19- 36
Sawlog	4.9	20+	44- 58
Hurley butts	1.3	20+	400- 550

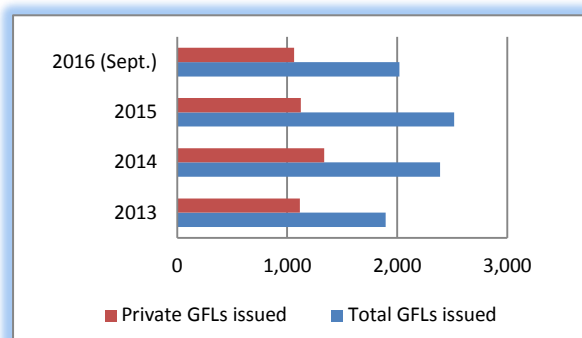
Sources: Private forest owners telephone queries by Teagasc FDD & IFA Farm Forest Timber Price Survey August /Sept 2016
Note: Prices should be viewed as indicative, not absolute

5. Private timber harvest 2015/ 2016

Approval for the felling of trees in Ireland is licensed by the Forest Service. Landowners are required under the 1946 Forestry Act to give notice of intention to fell trees. The number of General Felling Licences (GFLs) issued annually can be used as an indicator of how many forest owners are considering harvesting part/ all of their forests. These figures are presented in Figure 7.

The figure of 2,021 GFLs issued to the end of September, 2016 represents an area of 43,671 ha, comprising both Coillte and private sector forestry. Licences are generally issued for a 5 year period utilisation, and not all felling will occur in the year that the licences were issued. However, it is noteworthy that the number of GFLs issued to date in 2016 is 42% higher than the corresponding period in 2015 (Forest Service, 2015c, 2016).

Figure 7: General Felling Licences issued, 2013 to September, 2016



Source: Forest Service, various years

Table 5 shows the area of lands granted felling licences for both thinning and clearfelling in privately-owned forests between 2010 and 2016. The area issued with felling licences for thinning has been on an upward trend since 2010, with a 66% increase by 2014 (Forest Service, 2015a).

There was a nine-fold increase in clearfelling licenses issued in 2014 in response to Storm Darwin with licences issued for 3,447 ha for clearfell. The area licensed for thinning and clearfell in September, 2016 is already 11% higher than the 2015 total, albeit with a higher proportion of thinning licences issued.

Table 5: Area of felling licences issued for private forests, 2010-2016

Year	Thin (ha)	Clearfell (ha)	Total (ha)
2010	10,382	439	10,821
2011	12,275	590	12,865
2012	13,037	467	13,504
2013	15,150	394	15,544
2014	15,742	3,447	19,189
2015	11,198	2,012	13,210
2016 (Sept.)	13,460	1,216	14,676

Source: Forest Service, various years

In 2015, 3.20 million m³ of roundwood (including firewood) was harvested in Ireland (O'Driscoll & Hendrick, 2016), of which 0.73 million m³ came from the private forestry resource. This total harvest is the highest level since records began in 1961. A substantial part of the increase can be attributed to clearfells associated with Storm Darwin in 2014, as well as the increasing crop maturity of the private forest resource. Over the same period, 3.02 million m³ of roundwood was processed, a 2% increase on 2014 (see Table 6).

Table 6: Total roundwood in Ireland (2011- 2015)

Source	2011	2012	2013	2014	2015
000 m ³ overbark					
Coillte	2,942	2,485	2,588	2,517	2,470
Private	460	354	448	597	729
Total	2,952	2,839	3,036	3,114	3,199

Source: O'Driscoll & Hendrick, 2016

Interim figures for the number of felling licences issued to date for 2016 (see Table 5) strongly suggest that that volume of private timber available for harvest will be broadly similar for both 2016 & 2017. While the area of felling licence issued for thinning operations has fallen back to 2012 levels, the clearfell area remains significantly higher than the corresponding 2011- 2012 period (see Table 6).

6. Factors influencing timber supply and demand

6.1 Long term supply & demand

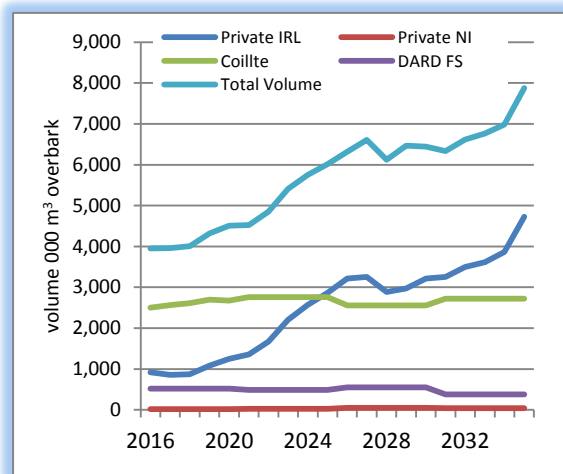
In 2016, COFORD updated the timber supply forecast to 2035 for the entire island of Ireland, to include both private and public forests. The total net realisable volume (the estimated roundwood volume that will potentially be available to the end user) will increase from 3.95 million m³ in 2016 to 7.86 million m³ in 2035 (Phillips *et al.*, 2016). This significant increase in roundwood supply volumes will almost all come from privately-owned forest in the Ireland (ROI) and primarily in the larger size assortments (Figure 8).

As can be seen from Figure 8, any real increase in the timber volume produced in Ireland to 2035 will involve the mobilisation of the private forest timber resource. In contrast, the Coillte Roundwood Supply Forecast 2011- 2025 predicted an increase in the thinning volume and a decrease in the clearfell area and volume in the period 2021- 2025 for the Coillte timber resource (Coillte, 2011).

Forecasts indicate that the net realisable volume from the private sector will fall slightly from 976,000 m³ in 2016 to 914,000 m³ in 2017. Private sector volume production is predicted to increase steadily, reaching 1.32 million m³ in 2020 and 3.21 million m³ by 2026 (Phillips *et al.*, 2016). Combining the Coillte and privately-owned net realisable timber forecasts for 2020 (4.67 million m³) will still result in a significant shortfall, if the increased demand for roundwood of 6.03 million m³ by 2020 is realised (Phillips, 2011 & Phillips *et*

al., 2016). It is estimated that the gross demand for wood biomass will increase almost two fold, to 3.084 million m³ in 2020, if the stated 2020 targets for renewable energy are realised.

Figure 8: Forecast of Total Net Realisable Volume Production to 2035



Source: All-Ireland Roundwood Production Forecast 2016-2035 (COFORD, 2016)

6.2 Renewable energy market

The current driver for policy in renewable energy is the European Renewable Energy Directive (2009/28/EC) which sets out targets for 2020 on an EU basis. The target for Ireland is for renewable sources to account for 16% of gross final energy consumption. To this end, the government has set targets of 12% heat and 40% electricity to come from renewable sources by 2020. Forestry has a significant role to play in supporting Ireland's approach to land-based climate change mitigation and its transition to a low carbon economy by reducing dependence on fossil fuels.

Latest estimates show that, after taking harvest and wood use into account, forests established since 1990 removed from the atmosphere a net 3.4 million tonnes in 2015. By 2025 the rate of removal is projected to be in the region of 4.7 million tonnes (DAFM, 2015a). These figures are partly dependent on afforestation rates and on agreed reference years. Ireland is currently in negotiations with the EU Commission and other member states to establish a framework for national contributions to Article 4.2 of COP 21-Paris Agreement.

Approximately 34% of the roundwood used in Ireland was used for energy generation in 2015, mainly within the forest products sector. The use

of wood biomass energy in Ireland results in greenhouse gas (GHG) emission savings from the displacement of fossil fuels. The saving in 2015 was estimated at over 0.6 million tonnes of carbon dioxide (CO₂) (O'Driscoll & Hendrick, 2016).

In 2015, the output of the forest-based biomass energy sector grew by 3% over 2014 to 1.28 million m³. In 2016, it was forecast that 1.8 million m³ of wood fibre are available, with a similar figure for 2017. It is calculated that by 2020, 2.2 million m³ of wood fibre will be potentially available (Phillips *et al.*, 2016). These figures are predicated on the mobilisation of the private timber resource, sourced primarily from farmer- owned forestry.

It is important to recognise that small sized roundwood suitable for energy uses is also the main raw material for board manufacture. According to COFORD Wood Mobilisation Group, (2015), product optimisation and increased harvesting intensity will increase biomass supply, but a sustainable annual harvest will remain a finite resource.

6.3 Certification

Certification is one way to prove that products come from well managed forests; providing sustainable environmental, social and economic benefits. It aims to re-assure (potential) consumers of the origin of wood used in timber products. To enable the export of Irish private timber, certification is gradually becoming a necessity, as private timber gradually moves from pulp to pallet wood and sawlog categories.

Private forest owners may need to consider participation in group certificates due to the cost involved. To facilitate this development, the Forest Service (DAFM) will initiate a pilot scheme in 2017 (DAFM, 2016a). The aim is to support group certification by making use of the Knowledge Transfer Group model. The objectives are to establish two certification groups for private forest owners. The experience from this project will assist in helping to develop a template for future Irish group certification.

Meeting certification standards involves chain of custody recording and compliance with environmental and social principles. There will be a financial cost attached to certification, both in terms of administration and changes in management practices. Although certification may not translate into higher timber prices,

certification provides better access to international markets thereby providing a competitive advantage. It remains to be seen how the EU's Timber Regulation (EUTR) and Brexit will impact on certification schemes.

6.4 Forest Health

The biotic threat potential to the national timber resource is a constant, as exemplified by three fungal- based diseases outlined below.

Sudden oak death

In 2010, the Irish Forest Service first detected sudden oak death (*Phytophthora ramorum*) on Japanese larch. These trees were showing extensive dieback from the crown and down the stem. Under current plant health policy, *P. ramorum* control has resulted in the removal of more than 1,300 ha of larch forests on the island of Ireland (DAFM, 2015b). Japanese larch is currently suspended from the Forest Service, DAFM approved planting list.

Ash dieback

In 2012, a serious disease of ash, known as *Chalara fraxinea* or Ash Dieback disease, caused by the fungus *Hymenoscyphus fraxineus*, was detected in Ireland. The disease can affect ash trees of any age and in any setting. Very high mortality levels can occur, with younger trees (> 10 years old) succumbing most rapidly. As a result, Ash is also currently suspended from the Forest Service, DAFM approved planting list.

Up to 30th of June 2016, findings of the disease have brought the current total for forestry plantations to 164. New findings have widened the general geographic distribution of the disease and the presence to a greater or lesser extent of the disease is confirmed in all 26 counties in Ireland (DAFM, 2016b).

As part of the All-Ireland Chalara Control Strategy, a comprehensive review of policy objectives, the prognosis for the eradication of the disease and options in relation to the disease is currently being completed by officials from DAFM and DAERA in Northern Ireland, further to the results of the surveys and follow-up inspections undertaken in both jurisdictions in 2016.

Dothistroma Needle Blight

Dothistroma Needle Blight (DNB) is a disease that can be caused by the two fungal pathogens, *Dothistroma septosporum* and *Dothistroma pini*. In September 2016, DNB was found in Ireland for the first time (DAFM, 2016b). Generally the disease will only cause mortality where the infections levels are high for successive years.

In Ireland approximately 10% of the forests are pine, mostly lodgepole pine with the remainder being made up of Scots pine, Monterey pine and Corsican pine. Sitka spruce the most common species in commercial forests in Ireland is deemed to have a low susceptibility to the disease. The Forest Service is currently surveying for DNB presence within pine forests and in pine-producing nurseries.

These diseases have both direct and indirect effects on timber supply and demand which include, the cost of eradication/ containment, the opportunity cost associated with suspended or restricted the planting of specific tree species and the price effect on a diminishing supply of a particular species. It is likely that the long term biotic threat will increase, partly due to increased levels of free trade & personal travel and the possible increase in disease risk due to climate change.

7. Carbon Sequestration

Forestry has significant potential to sequester carbon dioxide, thereby offsetting Greenhouse Gas (GHG) emissions from other sectors of society & industry and contributing to abatement. Forestry can contribute to GHG abatement through a range of measures:-

Using forest products for generation of bioenergy

The use of wood biomass energy in Ireland results in GHG emission savings from the displacement of fossil fuels. The saving in 2015 was estimated at over 0.6 million tonnes of carbon dioxide (CO₂) (O'Driscoll & Hendrick, 2016).

In 2015, the output of the forest-based biomass energy sector grew by 3% over 2014 to 1.28 million m³. In 2016, it was forecast that 1.8 million m³ of wood fibre are available, with a similar figure for 2017.(Phillips *et al.*, 2016).

Afforesting land

If fossil fuel displacement by forestry by-products is excluded, the sequestration potential for forestry is estimated to equate to 2.6 Mt CO₂eq

per annum by 2030, falling to 0.8 Mt CO₂eq per annum by 2050. Including fossil fuel displacement, the sequestration potential for forestry is estimated to equate to 4.2 Mt CO₂eq per annum by 2030, falling to 1.6 Mt CO₂eq per annum by 2050 (Teagasc Working Group on Greenhouse Gas Emissions, 2013). Research suggests that the national carbon sequestration potential of forestry may fall after 2035 due to the decline in afforestation rates after 1997 (Hendrick and Black, 2009).

Optimising forest productivity

Targeted species selection offers the potential to optimise afforestation schemes in order to maximise their carbon sequestration potential. For example, average growth rates for Sitka spruce (*P. sitchensis* Bong. Carr) can be increased from 17 to 21 m³ ha⁻¹ yr⁻¹, by planting trees on land previously in traditional agricultural usage (Farrelly *et al.*, 2009).

8. Outlook for 2017 and beyond

It is critical that afforestation targets are achieved and exceeded in 2017 and subsequent years if the National Strategic Plan target to expand forestry to 18% of the land area by 2046 is to be met. While most new planting will continue to occur on farmer-owned land, afforestation by non-farmers is set to increase, partly in response to common afforestation premium rates for both groups. Without both a sufficiently high afforestation rate and a sustainable harvesting rate, the significant medium-term supply shortfalls mean that we will not meet the demands of both our export driven timber processing sector and our expanding biomass sector.

Timber from first and subsequent thinnings is likely to continue to be the major component of the wood-based panels (WBP) sector and the growing wood biomass sector. It is crucial that appropriate thinning be conducted on suitable private forestry plantations. Forecasts indicate that the net realisable volume from the private sector will fall slightly from 976,000 m³ in 2016 to 914,000 m³ in 2017 (Phillips *et al.*, 2016). Teagasc, in co-operation with all sectors of the forestry industry, is seeking to mobilise the private forest thinning resource through dissemination of research, training and the building of familiarity with and confidence in the harvesting and marketing of the timber resource.

While domestic sawmilling demand is forecast to increase by 3.5% year-on-year between now and 2020, the sawmilling sector will continue to be dependent on its strong presence in the highly competitive UK market, as well as in Europe. The export market accounted for 80% of the total sawn- timber production and 86% of wood- based panel board in 2015 (IFFPA, 2015) and this situation is likely to continue into the future. The potential consequences of Brexit and its impact on the timber export market are unknowables at this stage.

Better timber prices will always be paid for forests that have good quality timber, road access, proximity to markets, good management and an economically advantageous plantation size. The on-going development of forest owner groups/ clusters will continue to help facilitate additional thinning and harvesting capacity & supply. The certification project commencing in 2017 is an important step on the road for private forest owners in demonstrating Sustainable Forest Management.

The wood energy market continues to develop as technologies are adapted/ introduced to optimise the contribution of forestry to the Bioeconomy. The anticipated two fold increase in demand for wood biomass to 3.084 million m³ in 2020 (Phillips *et al.*, 2016) presents a significant challenge to existing timber processing sectors. Other non-timber benefits of forestry such as ecosystem services, tourism and recreation have potential added-value in the longer term.

Investment packages are beginning to emerge in relation to the trading of semi-mature forest properties, including propositions on the forward selling of timber harvest rights. This is a new development in the private forest sector and may involve a range of investment scenarios (Irish Farmers Journal, 2016). A robust economic analysis of such investment scenarios is central to exploring the merits of this expanding forest investment sector. In certain cases, interest in semi-mature plantations may address landowners concerns over the perceived long production cycles and reduced asset liquidity associated with forestry.

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