Outlook on dairy market, handling of volatility in prices, and farm economic performance on basis of case studies in Ireland

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Presentation Objective

- Economic performance on Irish dairy farms
- Outlook for dairy markets and prices
- Experience and handling of volatility
Overview

- Background & Rationale
- Data and Methods
- Farm Income on Irish Dairy Farms
- Volatility in Dairy Price and Dairy farm incomes
- Outlook for Dairy Markets
- Mechanisms to deal with Price and Income volatility
- Conclusions
Background and Rationale for this Review

- Changing times for EU (and Irish) dairy sector
- Removal of EU Milk Quota System in 2015
- Created mixed sentiment across the EU
  - Growth opportunity in some Member States (MS)
  - Threat for dairy sector in some MS
- Concern for international market volatility
  - Volatile milk prices and volatile farm production costs
  - Some concern that quota elimination could exacerbate volatility
- Voluntary production restraint 2016?
  - Article 222 of the CMO
  - Currently a hot topic in Brussels
Measurement

• A lot of the data presented is official, market, periodical and journal related data

• But the micro farm level data presented is Teagasc National Farm Survey (NFS) data
  • FADN data provider for Ireland
  • Based on a sample of approx. 800 farms
  • Stratified random sample
  • Provides data on a range of socio demographic data in addition to economic data
Farm Level Dairy Economics in Ireland
## Farm Level Dairy Economics in Ireland

### Family Farm Income per Hectare

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (ha)</th>
<th>Income (€/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>56</td>
<td>1,112</td>
</tr>
<tr>
<td>Cattle Rearing</td>
<td>35</td>
<td>329</td>
</tr>
<tr>
<td>Cattle Other</td>
<td>39</td>
<td>424</td>
</tr>
<tr>
<td>Sheep</td>
<td>50</td>
<td>323</td>
</tr>
<tr>
<td>Tillage</td>
<td>63</td>
<td>546</td>
</tr>
<tr>
<td><strong>All</strong></td>
<td><strong>46</strong></td>
<td><strong>578</strong></td>
</tr>
</tbody>
</table>

Source: Teagasc National Farm Survey 2015

The Irish Agriculture and Food Development Authority
Family Farm Income per farm

Source: Teagasc National Farm Survey 2015
<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>Change from 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (litres/ha)</td>
<td>11,108</td>
<td>+6</td>
</tr>
<tr>
<td>Milk Price (€/litre)</td>
<td>30.3</td>
<td>-20</td>
</tr>
<tr>
<td>Gross output (€/ha)</td>
<td>3,614</td>
<td>-9</td>
</tr>
<tr>
<td>Direct Costs (€/ha)</td>
<td>1,426</td>
<td>-7</td>
</tr>
<tr>
<td>Gross Margin (€/ha)</td>
<td>2,187</td>
<td>-11</td>
</tr>
</tbody>
</table>

Source: Teagasc National Farm Survey 2015
Risk and Volatility on Irish Farms
What do we mean by risk?
## Farmers’ Risk Perceptions

<table>
<thead>
<tr>
<th>Average Ranking Position</th>
<th>Risk Factor</th>
<th>Average Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Price Risk</td>
<td>1.75</td>
</tr>
<tr>
<td>2</td>
<td>Production Risk</td>
<td>2.43</td>
</tr>
<tr>
<td>3</td>
<td>Personal Risk</td>
<td>3.08</td>
</tr>
<tr>
<td>4</td>
<td>Institutional Risk</td>
<td>3.40</td>
</tr>
<tr>
<td>5</td>
<td>Financial Risk</td>
<td>4.35</td>
</tr>
</tbody>
</table>

*Source: Teagasc National Farm Survey 2011*
Price Volatility Defined

- Price volatility is one of a number of risks
- Not easily defined
  - Common to think of volatility as increased risk
  - But risk is a subjective term
- "Price volatility is a directionless measure of the extent of the variability of a price" Gilbert and Morgan (2010)
  - Volatility is about highs as well as lows
Farming has always been a risky business.

But has it become riskier? Or more volatile?
Output Price Volatility

Monthly Milk price
1988 to 2015

Source: CSO Ireland
Input Price Volatility

Dairy meal (16-18% protein)
Monthly prices 1988 to 2015

Source: CSO Ireland
Farm Level Dairy Economics in Ireland

- Income and Volatility
Impact on Income

Dairy Farm Income

€ per farm

Source: CSO Ireland
Impact on Income

Dairy Farm Income

Source: CSO Ireland

The Irish Agriculture and Food Development Authority
Are farm households exposed to more risk?

Source: Loughrey & Hennessy (2015)
Sources of Volatility
Decomposition of Variance in Family Farm Income (2007 – 2012)

Source: Teagasc, National Farm Survey analysis

Index (Variance in FFI = 100)

Gross output  Subsidies  Direct Costs  Overhead costs  Covariances  Family Farm Income

Source: Teagasc, National Farm Survey analysis
Outlook on dairy markets
EU Milk Price trends 2001-2016
Source: European Milk Market Observatory
Outlook on dairy markets

- Volatility is set to continue
  - Based on weather, climate and policies
- Global Diary Trade 2016 figures for milk price are higher in Q2 than Q1
- Latest market prospects indicate that a recovery in international milk prices to ‘sustainable levels’ is not expected until H1 in 2017
- Means that coping with volatility is a very real issue at farm level, not just for Irish dairy farmers
Volatile, causes, implications and possible remedies
EU Policy (reform of 2003)
Enter Price Volatility

- **End of explicit EU price stability policy**
  - Global market volatility permeates EU market

- **Much lower “safety net” intervention prices**
  - Reduced from 2004 to 2006
  - Unchanged since 2007

- **Change of emphasis in EU Agricultural Budget**
  - Introduction of direct payments for dairy farmers
  - Much less emphasis on price stability
Causes of Dairy Price Volatility

- **Policy change in EU**
  - Low dairy inventory levels in recent years

- **Characteristics of the demand for food**
  - Inelastic demand

- **Combined with unanticipated variation in supply**
  - Due to weather, disease, etc.,

- **Small changes in supply can cause large changes in price**

- **Biology of dairy**
  - Production responses small in short run (yield adjustment)
  - Greater in long run (herd size adjustment)
Consequences of Price Volatility

- Low prices cause financial problems
  - e.g. low margins, cashflow management and debt servicing
- High prices lead to substitution away from dairy
  - Difficult or impossible to reverse (want stable ingredient prices)
- Extreme volatility leads to procrastination
  - Slows investment, innovation and R&D decisions
  - Wait and see mentality takes root
  - Culture of minimal stockholding, which itself contributes to volatility
How do we manage risk?
Risk Diversification

Pricing models

Emergency relief Income Tax Measures
Market based strategies

- Forward contracts
Forward Contracts

- Agreement to purchase/sell specific quantity at a specific price at a certain point
- Risk to farmer of default can be reduced
  - Only lock in a share of production in the contract
- Conflict of counterparty interests
  - Sellers want to lock in high prices / buyers want to lock in low prices
- Education required
  - Necessary to increase uptake of tools
  - For both processors and farmers
- Now available for milk production in Ireland
  - Glanbia and 5 other milk processors
Factors Affecting Adoption of Forward Contracts

Table 3: Results of stepwise OLS Regressions of Forward Contract Prices

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Price</td>
<td>0.442*** (0.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Recent Price Change</td>
<td></td>
<td>0.139*** (0.02)</td>
<td></td>
</tr>
<tr>
<td>Diversification</td>
<td>-0.077*** (0.02)</td>
<td>-0.070*** (0.02)</td>
<td>-0.066*** (0.02)</td>
</tr>
<tr>
<td>Milk Protein Indicator</td>
<td>-5.174*** (1.21)</td>
<td>-2.913*** (1.23)</td>
<td>-5.425*** (1.86)</td>
</tr>
<tr>
<td>Number of Children 16-19</td>
<td>-0.631** (0.29)</td>
<td>-0.751** (0.31)</td>
<td>-0.610* (0.32)</td>
</tr>
<tr>
<td>Operators Age</td>
<td>0.037** (0.02)</td>
<td></td>
<td>0.031* (0.02)</td>
</tr>
<tr>
<td>Milk Fat Indicator</td>
<td></td>
<td></td>
<td>2.471* (1.32)</td>
</tr>
<tr>
<td>Cost Per Litre (Cent)</td>
<td>0.087** (0.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production (10,000 Litres)</td>
<td>-0.044*** (0.01)</td>
<td></td>
<td>-0.031** (0.01)</td>
</tr>
<tr>
<td>Farm Size</td>
<td>0.022** (0.01)</td>
<td></td>
<td>0.020** (0.01)</td>
</tr>
<tr>
<td>Coupled Income (€10,000s)</td>
<td>0.150* (0.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>31.81*** (4.35)</td>
<td>42.21*** (4.11)</td>
<td>41.26*** (4.33)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>204</td>
<td>170</td>
<td>202</td>
</tr>
<tr>
<td>R Squared</td>
<td>0.285</td>
<td>0.263</td>
<td>0.124</td>
</tr>
<tr>
<td>Adjusted R Squared</td>
<td>0.252</td>
<td>0.245</td>
<td>0.093</td>
</tr>
</tbody>
</table>
Futures Market

- A future is a forward contract that is traded on an exchange
  - Quality, quantity, time and location
- A solution more suited to processors than individual farmers
- The contract’s delivery price changes as the real commodity market price changes
- Market can include participants from outside sector
  - Speculators
  - Widens pool of market participants
Dairy Futures Markets in the EU

- Growing demand for futures based risk management solutions in dairying
- In Europe primarily driven by demand from the dairy buyer or customer side
  - Already used for their non-dairy ingredient purchases
- Reluctance on dairy seller side
  - Could rely on EU policy to stabilise market in the past
  - Unfamiliar with futures markets trading as a result
  - Still a new area for dairy, whilst well developed on the crops side
Market based strategies

- **Insurance**
  - Asymmetric information, adverse selection, moral hazard, correlated losses
  - Barrier to insurance companies

- **US crop insurance**
  - Government subsidised premiums
  - Questionable success for Irish case
State strategies

- Price support & intervention policies
- Income stabilisation
  - Canada compensation based on change from reference period
  - Australian bond type smoothing mechanism
- Income Tax smoothing measures
  - Income averaging over 5 years now possible
  - Tax liability can be spread from good to bad years
State strategies

- New CAP - Risk Management Toolkit
  - Milk market observatory
  - Crisis reserve fund
  - Financial support for insurance and mutual funds
  - Income stabilisation mutual fund (few adopted)
  - €500 million distributed to dairy farmers 2015 from crisis reserve fund
State Strategies

- Voluntary Supply Constraint
  - Collective action to limit production
  - Where producer organisations (POs) and interbranch organisations (IBOs) agree to limit production
  - Allowed by EU legislation under limited circumstances
  - Voluntary & temporary (Art. 222 of CMO Regulation)
  - Limited in order to prevent anti-competitive behaviour

- Issue of how to regulate such agreements
  - Potential free rider problem
Conclusions

- Increased volatility likely to continue
  - Extreme weather, climate change and political unrest
  - Production costs, output volume and costs, incomes
  - Protracted ‘unsustainable’ milk price until H1 2017 is likely

- How to manage risk – reduce, mitigate and cope

- Market based strategies
  - Forwards eliminate both up and downside risk
  - More sophisticated tools may not be suitable for all farmers

- Policy options available but must be WTO and national policy compatible